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DIRECTING STUDY

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EDUCATING FOR MASTERY THROUGH CREATIVE THINKING

BY

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PREFACE

The aim of this book is to direct study toward mastery through creative thinking. The following may be looked upon as major aspects of the discussion: (1) to present various illustrative procedures; (2) to provide a theory and a plan of organization of classroom work in which this sense of mastery and power may be gained by students; (3) to indicate ways of dealing with individuals of varying achievements in the same group so that each student instead of the class-group becomes the educative unit; (4) to suggest shifts in emphasis from the traditionally assigned lesson in which pupils are asked to memorize or paraphrase and recite passively, to directed and controlled classroom activity (study) in which all pupils are participating, reacting agents all the time, and are moving forward, inspired by the challenge of problem-setting situations; (5) to move steadily from classified groups and group-mediocrity to individual activity and the co-operating spirit; (6) to propose as a guiding idea to all teachers that we give boys and girls things to do in the doing of which they will find out what we would like to have them know. It is becoming increasingly evident that incalculable sources of human power yet untapped await liberation from repressions and inhibitions of traditional prac-

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tices, and that we can confidently look for a new day to dawn in education when we devise ways of rewarding students not for *having* brains but for *using* their brains.

The point of departure, stated in the most recent categories, is the proposition that, *if* one boy's I. Q. (Intelligence Quotient) is 8/10, another 9/10, another 13/10, then it is the problem of education to develop methods that will insure the full release of powers in every individual. The boy with an index of 9/10 ought to be induced to do 9/10 of *his* algebra, language, science (any study) with a real mastery. By the same token, the girl with an index of 13/10 should be rewarded for a corresponding achievement with nothing short of 13/10 of *her* algebra, language, science, or any other study. In spite of any assumptions about native capacity, society will probably continue to reward the individual who *uses* his "talent," be it one, two, or five.

I have had especially in mind upper-grade and high school teaching in this discussion. Parents who participate so generously in assisting their children in getting the lessons assigned by teachers may well be interested. The improvement of teaching is held to be imperative in the inspiriting task of securing adequate schooling for the youth of the nation. While the discussion is centred about the problems of education in the Junior and Senior High School, Normal Schools and Colleges of Education will no doubt be vitally interested in the issues presented and discussed. Institutions for the training of teachers are now in a

strategic position to direct in productive ways the movements for supervised study, co-operative learning, project-teaching, measurements of education, learning for mastery, and creativeness in thinking. All these movements come to a focus in the *habits of work* which boys and girls are developing.

The task of education, as I see it, is the production of a people capable of thinking, and with a mental attitude which is tolerant, fearlessly honest, expectant of change, and creative. We need a mind capable of analyzing problems in the light of facts. The High School age is full of possibilities for the development of this proposition. In fact, if curiosity were not throttled, this view might be accepted as thoroughly sound in every stage of education.

We *make* the individual. Our public educational institutions are not certifying agencies, maintained to select the "called and chosen." The more hopeful view is that democratic education is concerned with the production of desirable changes and the prevention of undesirable habits in all individuals. The great teacher is the one able to stimulate curiosity, to foster interest in the search for knowledge, and to develop enthusiasm for the challenge of a problem. To guide mental life is the supreme work of the real teacher. Not the least significant factor in the development of a new general method, if it is to be a major achievement, will be the removal of inhibitions to learning.

To a very large number of my colleagues and other good teachers who have assisted me in working out illustrative procedures and in developing many

phases of the thesis presented in this book I am under lasting obligations. To Dr. F. M. McMurry, whose book, "How to Study and Teaching How to Study," has been a constant challenge for more than a decade, I am indebted in a very direct sense. He suggested *thinking periods*, as a substitute for *recitation periods*. We ought to be prepared now for the change.

H. L. M.

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DIRECTING STUDY

CHAPTER I

A MANUAL OF SUGGESTIVE PROCEDURES

Most parents send their children to school in the expectation that the teacher is in possession of something which is to be passed on or over to the pupils. The majority of students attend lectures with the same notion, and go to books to *get* what the author has to say. The emphasis in the use of text-books is too often along these same lines of absorption of subject-matter. School architecture betrays a philosophy of education; the furniture is arranged with a view to *instillation.* The devotion to "learning" as the acceptance of facts is remarkable in this age of scientific questing. The learner is almost universally regarded as a recipient. Communicated facts, all along the line—in mere telling, in reading the book, in listening to explanation, in sitting before the moving-picture—constitute the essential basis of "learning."

In the proposed procedure, not less, but vastly greater, use will be made of communicated facts. The situation to be avoided is a mass of unleavened dough. What we need to do is to see to it that the salt has not lost its savor. *Enough* should be done in the field of self-discovered facts to hold in solution the great mass of communicated material; *enough* work in self-dis-

covery to create a genuine taste for analysis and to develop appreciation of man's task in building our civilization.

A taught me mathematics [or any other thing for that] too often means that *A* instilled into me some of the knowledge *he* possessed, that he inoculated me with it. Surely that is superficial and erroneous. The fundamental truth is that he put me *en rapport* with mathematical processes, and such success as was attained is properly described as my adjustment to this quantitative aspect of reality and that of it to me. The adjustment was not of me and him, but of me and this department of truth. And the issue is vital. For we all know that *A* is sometimes so imbued with the conception of instillation that he is a positive hindrance to adjustment, well meaning and enthusiastic though he may be.*

Montessori has made an invaluable contribution to procedure for creative thinking. The child is brought into vital relations with his problem. The form-board, for example, is the subject-matter. The prisms and cylinders of different sizes and the arrangement of moulds into which these may be fitted constitute a major part of the controlled environment. The child faces his problem with something to do. If he places the blocks in their respective moulds without difficulty, then there is no challenge to thinking. Or, to put it in another way, if there is no "fumbling and success," no thinking will be initiated. With Dewey, mind is the instrument by which we overcome obstacles *and thinking takes place only when action is checked.* If the child comes to the placement of the last block—prism or cylinder—and finds the form into which he tries to place it too small, he is at once confronted

* Adamson, *The Individual and the Environment*, p. 28.

with a real problem. What has been done must be reconsidered. He may see at a glance that some piece has been placed in a form too large for it; he may have "to throw down the type," as it were, and start all over, not once, but many times. In this situation the business of the teacher is *to watch* with an Emersonian *respect.*

But the old education is impatient with watching. The teacher or the book steps in and tells the child just what to do, or actually does it for him. The institutional teacher rearranges the pieces on the child's form-board and *shows* the child how easy it is (for him —the schoolmaster). As hopefully expect the child to learn to lace his own shoes by doing it for him everlastingly, as to expect mastery and creative thinking as a positive outcome of our conventional practices. Even the questions (so-called), intended to guide the pupil in a learning situation, are so framed as to disclose the answers, thereby destroying the basis for creative thinking.

The exponents of efficiency in education will urge the necessity of economy and "results." It will be shown that we do not have time to wait on the child's procedure of "fumbling and success." Perhaps all we need to say in this connection now is to suggest that any move on the part of a teacher in the pupil's dilemma in a learning situation should not checkmate the pupil. In the interests of economy a particular stumbling-block may be removed. The aim should be to assist the learner to further effort in the solution of his problem. We shall attempt to indicate in these illustrative procedures that where there is no problem there is no thinking.

For the past five years a class in Plant Life (9th and 10th grade Agriculture) in the University of Wisconsin High School has been conducted under *geared-up* Montessori principles and in accord with the procedure suggested in Exercise I, page 6. The materials of the course were set out in concrete forms and *the question as a factor of control* was used with rare skill.

In every subject the materials of instruction should be so fabricated as to enable the pupil to check up his thinking. The objective means of checking up one's work will not be so evident in all subject-matter as is the case in the form-board; yet there are unrealized possibilities of organization of both subject-matter and procedure to this end. Much of the lack of intelligence in school and college is due to lack of necessity for rigid intellectual discipline and a definite responsibility for whatever thinking goes on. The professions of education and medicine may yield to the profession of engineering in the following vivid and rather severe, perhaps unfair, contrast:

> Fortunately for us, most diseases are self-eliminating. But it is natural for the physician to turn this dispensation of nature to his advantage and to intimate that *he* has cured John Smith, when actually Nature has done the trick. On the contrary, should John Smith die, the good doctor can assume a pious expression and suggest that, despite his own incredible skill and tremendous effort, it was God's (or Nature's) will that John should pass beyond. Now the engineer is open to no such temptation. He builds a bridge or erects a building, and disaster is sure to follow any misstep in calculation or fault of construction. Should such a calamity occur, he is presently discredited and disappears from view. Thus he is held up to a high mark of intellectual rigor and discipline that is utterly unknown in the world the doctor [or the teacher] inhabits. (*Civilization in the United States*, p. 455.)

It is maintained that engineers head the list in intelligence, being rated 60 per cent higher than doctors. The rating of doctors above (or below) teachers is not disclosed, nor is it to be assumed that the work of teachers can be checked up with such exactness as that of the engineer. Nevertheless, the position is maintained that the profession of teaching may be made a challenge to intellectual rigor and discipline comparable to the challenge that comes to the engineer. This high ground is not to be reached by mechanical methods, by dismissing John Smith from the class or school, by burying curiosity alive, nor by any presuppositions about God's (or Nature's) will to the effect that John can't learn it. With the engineer we need to cultivate the courage and develop the technic to build bridges in the face of self-created obstacles.

It is perfectly possible to become so obsessed by the instruments of education as to inhibit vital learning. The specialist and the pedant are both open to this danger. The former tends to lead the pupil who is not so tall as a rule into the narrow channel of specialization or within high protective tariff (pedagogical) boundaries, and too often suffocates him among the dust of detail, for the specialist is still able to see beyond the narrow margins of detail and catch something of the meaning of making the detail a witness to a great and universal significance. The pedant, on the other hand, too often superimposes subject-matter, method, problem, "project," leaving the pupil an everlasting minor. All of this is a disregard of the democratic ideal in procedure. The consent of the governed is denied. We want to indicate in these suggestive procedures a life basis, a plan of participation, a means

of a shared life, a kind of mutuality in which the pupil becomes a partner in a developing subject and in a self-realizing, self-originating plan. The hope is that even greater levy on facts, information, and data (accredited subject-matter) will be made than is possible in the recitation system or the lecture method.

Many suggestions in *directing procedure* for creative thinking have been incorporated in the discussion. The reader may loop them up in this connection as he chooses.

I

For point of departure. (This exercise is of inestimable value for all teachers, including parents, from the kindergarten to the graduate school.) The building (creation) of any story will serve the purpose here. The *aim* is to furnish the mind with something to work on with a *real question in front of some potential answer.*

Bill (seven or eight years of age). "One time there was a man left on an island all alone." (More data may be furnished if the experiment calls for further facts, such as: in this man's home there was a picture of a ship, or this man's father was a captain, etc.) Now, raise the question. "How did this man come to be left on the island?" Bill will find a solution.

Bear in mind, the old education would have the learner read the story and reproduce it, or the learner would be told the story (answer) and asked to repeat it. In the quest for creative thinking the child works out his own story, recreates the story within a controlled environment. The new teacher furnishes the mind with something to *think with.*

Bill (further on in the challenge). "One day *your*

Robinson Crusoe got sick. What could you do in your own home that your Robinson Crusoe could not do? What would your Robinson Crusoe do?" Bill will work it out.

The text of Defoe's *Robinson Crusoe* may be used after raising productive questions in the minds of our boys and girls. The teacher knows the standard story. His task is to think it in terms of challenges, and then to set forth data which will stimulate curiosity, and cunningly put a question which the data suggest. All of the text material may be aligned ("covered") in this procedure *after* the challenging questions are raised, and the creative genius of the boys and girls is given a chance to express itself.

The *leit-motif* of all history is suggested in this plan of approach. The time may come when history up through the high school will be studied with a view to building minds capable of analyzing problems in the light of facts.

II

Social Studies and Science

For any year of the junior or senior high school. (The college needs it.) *Data.* Radio work. Wave-lengths (bands) in the air. Broadcasting news. A committee of radio experts of many nations sitting in Paris. The experts proposed that specific wave-lengths of high frequency be allocated (assigned) to each nation.

Questions.—Why? Any bearing on a League of Nations?

Procedure.—Pupils (including girls) do not need to be assigned readings in order to answer intelligently

these questions. They may be presented the *data* and at once *try* their wings on the questions. First, *discussion* in terms of experience and *broadcasted* knowledge among youngsters to-day and *then* readings followed by a productively written chapter on "The Relation of Science to Modern Life," or "The Development of Radio."

This experiment was carried out in a large class of 10th-grade pupils and incidentally tried out on a half-dozen college seniors (men). The latter failed ignominiously. They appeared dazed. They had been corrupted to the very roots under the doctrine of "learning" as the acceptance of facts, and before the *data* and *questions* they appeared helpless. They could have taken notes on a lecture or read assignments, and they could, no doubt, have *reproduced* and *recited* with rare brilliancy. The boys and girls were alert to the *questions* in the *light* of the *data* presented. One little girl said: "The nations will have to agree on a distribution of wave-lengths, or else all news will be broadcasted, and then there would be no secrets. Nations would have to behave." A boy said: "The fact of getting together and agreeing to assign each nation a particular set of wave-lengths would mean unity." Another with a free mind at work said: "Each government would have a machine tuned for each nation and would catch any messages sent from one to another, but the governments would agree not to broadcast each other's private affairs," etc. (The discussion would have been illuminating to our statesmen.)

III

For Any Grade above 7th and below the 17th

For "substance of doctrine" as well as a realizable procedure in any school.

Problem (or challenge).—*The development of a scientific (experimental) attitude. Data.* Two characters representing:

(*a*) The "Old World"	(*b*) The "New World"
Key. "Old World" is *closed.* Things are fixed.	"New World" is *open,* expectant of change, creative.
"Nobody ever did it, therefore it can't be done."	"So he buckled in with a bit of a grin at what could not be done, and he did it."
	(In this experiment a pupil in the class found a poem and boiled it down to this. He was stimulated by the Old World motto.)

Procedure.

(*a*) Now let Aristotle and Sophocles debate with Burbank and Edison. (St. Augustine and Luther might be induced to debate with Bacon and Darwin. A dramatized debate for adolescents is usually a spirited event and elicits the best in the debaters.) The pupils (10th grade or later) will be able to write (create) a play in which these men are the leading characters. They may summon other characters to speak. This was done. The "New World" may have a slave out of the Old World to portray his life; a woman may also be summoned to relate her lot. One girl in working up such a play proposed that she be a fairy and have the boy of the class interested in science become a wizard.

(The fairy played the part of "Looking Backward" from 1950. The play as well as the debate has proved valuable and interesting.)

An enormous amount of "accredited" subject-matter can be looped up in both the *production* of the *debate* and the *creation* of the *play*.

(*b*) *Data* for another part of the challenge

The "Old World" says:

"The acorn can grow *only* into the oak."

"Wild oats can grow only into wild oats."

"The boy grows up into the man, and the boy can become *only* what his heredity makes him."

The "New World" answers:

"New species can be developed by man." Burbank tells us a lot of interesting things.

(*The pupils work this out.*)

Mr. Edison, what is your answer to the "Old World" here, when "they say": "We have always had candles and they make the best light ever"?

(*Let the pupils work all this out.* It can be done in discussion, through reading and discussion, through film and written reactions, through debate, through dramatic representation, through writing a chapter in a creative book made by the pupils themselves.)

(*c*) Data (once more)

The genius is born, not made, says the "Old World." Talent is donated. Hence there must always be "those who" can and "those who" can't do it.

How is the "New World" going to answer now?

(Any live class will be ready for a thrilling debate. If so, let it be negotiated.)

Do we make the individual in the "New World"? How?

What is the purpose of education?

(*d*) *Do you think the "Old World" has a name-and-date period?*	*Do you think there are any "folks" living in the 20th century who really have minds and entertain ideas belonging to the 5th, 14th, or 17th century?*
(*e*) The "Old World" says: "We have *always* had war and we always will." *Are arts, science, music, architecture, literature nationally bounded any longer?*	*What* is the "New World's" answer? (A good time to examine the history of international agreements and co-operations in exhibitions, congresses, Postal Union, Red Cross work, and League of Nations.)

(*f*) For pupils in the senior high school (and the college) the possibilities and unifying effects of international insurance and the world-wide extension and application of the Federal Reserve Bank may be discussed and worked up into original (creative) chapters. It is wholly superfluous to add that an infinitely greater amount of information will be required in this problem-procedure than is possible under the cut-and-dried lecture system and lesson-assigning, lesson-hearing school where all march in regimental uniformity.

The time to be allotted to this exercise (III) is left to the discretion of the school and its new teacher. There is easily a whole semester's work suggested here for a class in *Social Science*. Many transmissions ahead are possible in problems of this kind. One week spent in *experimental questing* along lines suggested in this exercise has proved a profitable venture, not only in senior high-school science and social studies, but also for students (college seniors) preparing to teach. In

any case it is well to have the students construct a chapter on some such topic as the "Development of Modern Science."

IV

For 6th or 7th Grade

Challenge.—The fraction operating in the equation. (One of a few outstanding principles to be mastered.)

Exercise.—$\frac{4}{5}$, or $\frac{2}{3}$, or $\frac{2}{7}$, or $\frac{1}{13}$, or $\frac{5}{11}$, or $\frac{1}{2}$, or $\frac{5}{2}$, or $\frac{25}{6}$ of my money is $100. How much have I in each case?

Procedure.—(Intended to clarify the principle involved.)

Working Materials.—(If the first day of school, let the teacher be provided with a pocketful of pencils and plenty of scratch paper prepared to start *work* at once; keep every youngster so busy that no time is available for "fooling.")

If *four dogs* cost $100, what will five dogs cost? (Work it out orally, finding cost of *one* dog first and then five dogs.)

Now express it thus:

$$\frac{4}{\text{dogs}} = \$100$$

$$\frac{1}{\text{dog}} = \frac{1}{4} \text{ of } \$100 = \$25$$

$$\frac{5}{\text{dogs}} = 5 \times \$25 = \$125$$

Again. If *four-fifths* of my money, etc., *i. e.*, substitute *fifths* for *dogs*. (Subsequently substitute for *dogs* (the denominator) *thirds*, *sevenths*, *thirteenths*, *elevenths*, *half*, *halves*, *sixths*.)

Now express it thus:

$$\frac{4}{\text{fifths}} \text{ (of my m.)} = \$100$$

$$\frac{1}{\text{fifth}} \text{ (of my m.) must equal (?)}$$

Finally express it:

$$\frac{4}{5} \text{ (of my m.)} = \$100$$

$$\frac{1}{5} \text{ (of my m.)} = (?)$$

$$\frac{5}{5} \text{ (of my m.)} = (?)$$

(There will be need of clarifying the idea of unity.)

Above all, see to it that *dogs* and *fifths* are *denominators*. (Teachers, I pray you, dwell on the *meaning* of denominator.)

Before using the exercises in the book the pupils should *make up their own exercises* for two or three days, using all sorts of imagery in the *denominators* employed.

Swinging out into a new challenge with a clearing up of the fundamental principle involved, using simple, vivid, illustrative material to exemplify the principle, ought to bring pupils into a better and a more abiding understanding of mathematical reality than is exhibited in the endless working of sets of "problems" by formulas, or ready-made patterns.

V

Challenge.—A set of exercises in arithmetic, algebra, a foreign language, or any other subject in which a number of exercises in some organizing principle is clearly presented. To illustrate:

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Factoring in algebra (8th or 9th grade) is the unifying core of a part of the course. After five minutes of general explanation of a new phase of factoring in which the whole class participated, each pupil started into the set of exercises and worked as rapidly as possible. The teacher checked results, guided procedures, explained to any one pupil or group of pupils some principle needing further elucidation, called the whole class to concerted attention when any fundamental concept could be focussed upon economically. The exercises in this illustration involved the differences of squares. Some 60 exercises were listed. In the course of the remainder of the class period the number of exercises mastered ranged from 10 to 55. No upper limit was set. Each pupil worked forward in the challenge at his own best rate.

In a class in geometry, 36 pupils all started at the beginning of a 70-minute class period on a set of 19 original exercises listed at the close of the book on the circle (Wells and Hart). The pupils worked in pairs at the board. Their work was checked as rapidly as enough proof was given to indicate mastery. Five pupils who began 10 minutes before the class period formally began completed the entire set during the class period. The range was all the way from a mastery of 3 exercises to 19 exercises. The teacher was kept busy checking results and suggesting modes of attack to pupils in difficulty. The two boys who finished the entire set 15 minutes before the period was up assisted the teacher in this work.

The same procedure may be employed in word study, work on sentences, reading of literature of a type or period, composition, exercises in foreign language, etc.

Two important matters should be mentioned in this connection: (1) The organizing principle should be clear. (2) No upper limit should be set in the number of exercises. Enough work should be at hand to challenge every ability in the class group. It is not a uniformity that is sought in true education. The unity (not uniformity) is gained by all those co-operations which evolve out of a challenge clearly distinguished as to some organizing principles and a progressive series of exercises within the gripping principles.

VI

10TH GRADE (MATHEMATICS: CORE—DEMONSTRATIVE GEOMETRY)

Challenge.—The Circle. (The material, the best modern texts—Book II.)

Procedure.—(The procedure in this illustration is based upon the work of a class of thirty-eight pupils of very wide ranges of "capacity" and achievement. In fact, a conspicuous minority of this class had been tried and found wanting—pronounced to be, if not "mathematical idiots," at least mathematically disinclined or obsessed by defense mechanisms. One purpose in the experiment was the attempt to demonstrate the feasibility of managing a large section with extremes of "ability" and attainment, well known at the outset.)

(*a*) When the challenge was entered upon, a word was mentioned about *the assignment.* The assignment was the *circle.* For a period of five or six weeks nothing was said about assignment. No *daily* assignment was mentioned. The individual pupils who needed stimulus were *operated* on as they needed it.

(*b*) The class period (70 minutes) was developed into a work period. This class period has never proved too long—always too short. Work begun in class was continued out of class largely upon the initiative of the pupils. Saturday mornings were employed for clinic purposes for any pupils who for any reason (absence mainly) did not make satisfactory progress. Four hours on the job, steady, makes a difference in any struggling pupil. (See Chapter II, p. 71.)

(*c*) The challenge (the circle) is the organizing principle, and the exercises and propositions furnish the differentials. (See Chapter IV.) The big challenge was broken up into four or five major organizing principles around which and with which discussion could be carried on in a profitable manner. Recitation work, as we ordinarily find it, was deleted.

The following organizing means were employed as principles to *think with:*

1. *A radius perpendicular to a chord.*
2. *A radius drawn to a tangent at point of contact.*

3. *Measuring angles.* Angles measured by the same number of arc degrees.
4. Parallels intercepting equal arcs.
5. Loci problems—a few *clarifying principles.*

These, or some aspects of them, were written on the board from time to time to guide the thinking of the pupils.

(*d*) No effort was made to keep the class together. Goal ends were mentioned from time to time. "Now, don't you think we had better be prepared to discuss *measuring* angles next Monday?" Or, "Would it not be a good idea for you to have mastered our challenge by next Saturday night before 10 o'clock, so that we can all start on *loci problems* one week from to-day?" No two pupils were ever found at the same place in any part of the challenge. Responsibility was sought in many ways. The great majority of pupils in a *working* laboratory do not need to be prodded and supported in their work. After working into some part of the challenge, after mastering some of the *working tools,* and after learning the game, as it were, by individual guidance and checking of results, the whole class enter into vigorous discussion and snappy response to rapid-fire questions.

The *aim* in this *work procedure* is to bring the whole class to a concerted "attention" *only* when some organizing principle can be *economically* cleared up for all members of the class by a single drive, or when *enough* work has been accomplished in a given part of the big challenge to make a class discussion profitable for (practically) every member of the class, because every one has actually turned out some work of his own in the part of the challenge under discussion, or (concerted attention) when the aim is gripped up in the contest or game spirit, wherein it becomes a matter of vigorous rivalry among individuals or between groups in which true sportsmanship sweetens the competition of life.

(*e*) In the procedure individual achievement is focal. Out of individual activity class co-operations are developed. Partnership teaching is employed. There must be no lesion of the social sense in this drive for individual mastery and responsibility. For one very important type of teacher-activity in this work period, the reader is directed to Chapter IV, p. 120 *ff.* It will be recalled that the teacher is now a *directing genius,* never sitting apart engaged in any sort of busy aimlessness, such as

occupying the furtive pulpit in a supervisory capacity, correcting papers, visiting somebody who comes to "see" the imponderables. The new teacher is first of all master in the challenge, ready to give a hint in any part of it. For some pupils will be plunging ahead; others will bring in new material. A live class will require a teacher alert in many directions.

Referring again to Chapter III, let us examine the teacher's task at the point of the learner's *real* difficulty. This is no cramming, memorizing school now. We are not interested in developing the mirror-minded pupil. That can be done. Tens of thousands of pupils have absorbed enough geometry to pass it. They have pursued it with no confident hope of overtaking it.

The habit of writing on a pad just what the *consulting expert* (the new teacher) says to each pupil (or group of pupils—two or more) *at the fork of the road* in the dilemma which each pupil sets forth—that habit is stressed because we feel sure that teachers talk too much. They have so much to impart!

"What are your data? State each point in your hypothesis."

"Draw your figure with your instruments."

"Trace the angle with your finger as you read it."

"Where is the vertex of an inscribed angle?"

"Express the arc degrees. 360—arc AC. Now try it."

"Make sure of your proposition here."

"Which way do you think the author intended to solve this one?"

"Look at the board. *Angles are equal if*——"

"You need a *plan*, don't you?"

"Have you examined all the facts in your hypothesis?"

"Oh, but is that a central angle?"

"Talk to your figure."

"Have you used *all* your hypothesis?"

There is no end to this kind of personal, intimate suggestion with a group of pupils *at work* in a challenge with no *upper limit* for any one. These directing hints are given to the pupil in his puzzled state, to two or more pupils working at the board together, to the whole class now and again.

The highest achievement is to develop minds capable of analyzing problems in the light of facts. This procedure is aimed at *that* goal in every stage of its development.

Work is done in note-books and checked. Not all exercises

are written out in full by every pupil. Some work is checked from the blackboard. Oral explanation is accepted in many instances. Often a clear-headed pupil may simply *schematize* the proof for the teacher. Pupils rising to their mathematical heritage "as if to the manner born" (always by hard work, for any "talent" here is a task) are given the privilege of assisting the teacher in checking work which is being turned off at high speed—a thing which happens very frequently when pupils get their "second wind" in the challenge.

No contribution, in my judgment, to better teaching and thinking has been made than the introduction of the idea of having the pupil work with a *plan* in mind. (Mr. Hart, University of Wisconsin, has made this procedure perfectly clear.) In reality it is the essence of the scientific mode of thinking. The goal (conclusion) is set out; it is the city yonder toward which the road is to be built. Too often the learner is allowed to think that the road determines the direction of the city. Not so. The city determines the general direction of the road. The particular, immediate direction the road takes at any given time in its construction is influenced by circumstances. No matter, if, for the nonce, the road seems to be veering off to the right or left, or, for that, directly opposite from the city (goal)—provided *only*, the city is in the surveyor's mind as the objective. The pupil in a situation in which creative (scientific) thinking is possible ought to be given this rare privilege of building his road to the city. He is both the surveyor and builder.

So, to every pupil in this work procedure: "What is your goal in this and that part of the challenge?" *Now:* "What is your *plan*, your (intellectual) *method*, by which you expect to build the road toward your city?" The consulting expert (the new teacher) will understand the significance of circumstances which deflect the mind of the pupil from an air-line construction of the road to the city. "Try it. It may work." "Make the adventure. You may find that your *plan* will lay golden eggs for you." Such remarks are not idle. They may prove to be *encouragers*. These builders need many encouragers along the way. Judicious praise should not be spared.

(*f*) In the various forms of concerted classroom activity, the reader is again directed to Chapter III. One thing more

seems fruitful. The uses that may be made of the half-dozen, or more, very difficult original exercises in the challenge on the circle have not been exhausted. They furnish excellent material for the emerging masters of the challenge in the class. It is a refreshing, exhilarating emotion to hear high-school boys and girls say: "I spent four, six, or eight hours on that exercise, and I'm going to get it." That is a shocking thing to hear in these days of "soft" pedagogy and the process of "painless" information and "movieized" education!

An additional use of the most difficult original exercises is suggested. (Four pupils in the experiment on the circle had emerged triumphant at a certain station in the journey. In the old rural school they could have been sent to the spring a half-mile away to carry the pail of water to their thirsty classmates—one of the real boons in that old school, and, by the way, an excellent device for getting rid of "bright" pupils for a weary hour.) These four pupils, who had mastered a certain set of supplementary exercises, were given a chance during the class period on this day to draw a big circle on a piece of paper and to put into that circle all manner of lines. The chart was exhibited, and the pupils were challenged to formulate as many conclusions from the complicated figure as possible. More than fifty were suggested—an excellent review, by the way.

Now, with these four out of the way, and protected against being bored, let us suggest the additional use of the very difficult exercise.

"All of you, let us draw a circle." "Read carefully exercise so and so." Inscribed hexagon, not a regular one. "What data (facts) are given?" Two pairs of opposite sides are parallel. *Conclusion*—The two remaining sides are parallel.

Now for a *plan*. (All working on this exercise, except the four who have it.)

"How do we prove lines parallel?"

"We have a right to do anything we choose or *will* to our figure."

A diagonal is hit upon. The *plan* is set forth. Pupils discover it themselves.

"Keeping the *plan* (blueprint) before you, let's work by it."

"Examine every item in your hypothesis." (Each pupil, on his own mark now, writes all he can, *using* his hypothesis.)

Certain arcs are found to be equal by *using* the given facts. "Angles may be proven equal. How?" (Perhaps all the ways previously developed will be proposed. Here is the teacher's opportunity to ask what the author perhaps had in mind in this exercise. So, it may be necessary to point to one of the organizing principles in the challenge—just a physical gesture—to *measuring angles*, etc.)

The rest of the solution is a manipulation of equations, and it is necessary, it seems, to give a short class drill on handling simple equations.

In this concerted class work it is important to impress this point: "William, are you paying attention?" "Yes," he replies. "*Then quit it!*" *Yea, verily, quit it.* It is highly probable that the habit of "paying attention" is from the medulla oblongata *down*, not *up*. The drive of attention forward into new difficulties *at the point of crisis* calls for eternal teaching vigilance.

We have used a very difficult original exercise as a means of clarifying the use of data (given) in developing a plan (or intellectual method) of attack.

The most difficult exercise may be utilized also as a basis of review—a thoroughly sound practice in which the simpler elements are caught up in a new synthesis.

The so-called "bright" or "clever" pupils (always emerging *in* and *through* work) are not required to listen to what they know perfectly well. They can refine their thinking by participating in the *development* of a technic of attack. They enjoy working out "the rules of the game."

The "poorer" thinkers in the class have not suffered. They have something to reach up to. It is not a confusing situation to them. They may not have been able unaided to solve the exercise. That is, in this point of view, a secondary consideration. The difficult exercise has been used to the benefit of the entire class. Every individual in the group has found in it something worth while.

(*g*) *Observations.*—(1) Out of the last point, first: Is it not a futile cry to try to determine the native capacity of pupils ready (for one reason or another) for the great adventure (into geometry, physics, Latin, agriculture, what not), and thereupon to classify alleged abilities? This class of thirty-eight boys

and girls exhibited as far-reaching differences in achievement as could be found in any group. No one was held back because of a "mentally delayed" classmate. The circle is big enough and flexible enough for a challenge to every ability. *The circle is a function of the radius. A "short radius" can describe a complete circle; a "longer radius" can describe a complete circle; a "very long radius" can describe a complete circle.* The big circle is not scandalized by being associated with the little circle. The small circle need not be humiliated by a big one. Two essential matters emerge. The circle offers the unifying, organizing principle; all sorts of transmissions ahead are provided in the endless variety of materials utilized in the challenge. No two radii need to be the same length except in the same or equal circles. No two individuals could conceivably be the same; no two individuals could possibly have identical environmental factors. In fact, two children in the same home may receive from their father diametrically opposite training. We are in dire need of a careful social diagnosis in our efforts to appraise the reactions of pupils to tests of all kinds. It is supererogation to add that the "radius" is not a constant in the same individual.

The silly administrative twaddle we are hearing these days, to the effect that there are *those who* cannot learn geometry, and that there are *those who* can do no more than memorize a few propositions with a full demonstration included, is *only* another method of dodging responsibility. To parade now in the "livery of science" by classifying our potential mathematicians, physicists, etc., in terms of their I. Q.'s (intelligence quotients) is evidence of another good idea done to death by educators having a penchant for fads. It is ridiculous to maintain that the boy with an I. Q. of 77.77 cannot profit by a study of geometry (or any other study for that).

(2) It may be urged that the "poorer" pupils in this class are unduly tempted when taken up into the high mountains—the high peaks of the difficult original exercise. The objectors and doubting Thomases are perhaps influenced by the Biblical account of his Satanic Majesty and the temptation scene, but we hasten to assure them that ours is only a decided leaning toward "prescribed" *temptations to excellence.* The "poorest" pupil in the class needs to be lifted up where he too, now and again, may catch something of the vision and perspective of the mountain-

climbers. What he does on his "level" will soon begin to take on a new significance by the fact of having caught a glimpse of higher reaches, even though assisted in the climbing.

(3) Chapter IV is illustrated in this challenge. The organizing principles and differentials are admirably delineated. Provision is made for individual differences. *No minimum essential is ever allowed to degenerate into a maximum necessity.*

(4) A group mediocrity is not desired. In fact, the more highly selected the class group the greater the possible ranges of achievement. Endless differentiation is possible where endeavor is negotiated on a *life* basis. If anybody actually wanted a *bona-fide* regimental uniformity in things intellectual, moral, and spiritual, the way to get it is to assemble for the study of geometry a class of functionally near-imbeciles. There would be, no doubt, a high degree of uniformity in such a group. It is not, however, essential to have approximate equality of "capacity" in any normal group for the pursuit of any subject in the curriculum.

(5) Testing for mastery may be conceived in many ways. In this class the challenge was closed (never finished) with all on their marks for a class period, writing on as many of some dozen parts (exercises) in the big challenge as they could do. Twenty-five per cent was given for each one of the twelve mastered in the class period. Some pupils earned as high as 300 per cent. For those who fell below 100 per cent, a Saturday morning was set apart for a second or third try-out with all the time the pupil in difficulty wanted to use—four hours or more. A dozen hands were up to volunteer to coach a classmate in difficulty, preparatory to the Saturday-morning opportunity class. The test for mastery in the Saturday-morning situation was similar to the one just described. The boy, a victim of defense reactions, finally got the belt on his generator in a Saturday-morning class after about an hour's fussing the spinal cord, and actually got down to hard work and made 175 per cent in the test for mastery. The new teacher will refuse to regiment adolescents under time-and-space-efficiency methods. *The law of chance needs to be distributed more equitably than happens in any test by the clock under the hammer.*

(6) What we have indicated in this elaborate presentation of

six to eight weeks' work on the circle is applicable to almost any other subject in the curriculum. The reader is urged to note again the illustrative exercises, pp. 120 *ff.*, 130 *ff.*, 160 *ff.*, in the body of our discussion. To be sure, each course must employ its own special technics. There is no general method, universally applicable as a method, such as the enthusiasts for the "project" level of teaching would seem to imply.

(7) The tired, the inert, the mechanical teachers (made such by the system), and all others who enjoy poor pedagogical health, may not have the courage to make the adventure upon the *challenge* procedure.

(8) "They say": All this could be done if we had teachers of dynamic personality. The answer to this honest scepticism is by way of analogy. The old practitioner in medicine, let us assume, is a wholesome, radiant, dynamic personality—a lovable man who kisses all the babies in the neighborhood. Across the street is a physician-surgeon who has mastered the technic of modern medicine. His personality is not particularly charming or virile, but he knows modern medicine and surgery. To which one is a man going for an operation? The initial act is bound to be far-reaching. The system employed does make a tremendous difference. The ideal is a new scientific humanism.

(9) And "they" will ask: How do you know these thirty-eight pupils have done any better than they would have done under the recitation system? Frankly we don't know. It is a manifest impossibility to compare the same pupils in two different systems. We could crawl among the dust of figures, piling up the "averages of the averages," and, perhaps, make out a case. But we maintain the proposition that the common practice of resorting to the popular psychology of arithmetic, believing that an argument backed up by cold figures must carry certitude, is a fallacious practice. It may be mere rationalizing—just a method of arraying evidence to support a belief already accepted. The essential matter lies deeper. The drive is headed up in the direction of building minds capable of analyzing problems in the light of facts. The mind, conceived as a *truth-finding* apparatus, is held to be an aim far superior to that of making the mind a *truth-testing* apparatus. It is the difference

between education as a creative, productive process and education as an assimilative, reproductive process. Suffice it to say that these boys and girls took to their work as ducks to water. That, also, seems to be a worthy measure of educational practices.

(10) There were no "failures" in this class. The goal set for every member of the class was mastery. No primitive foolishness was entertained about failing 13.3 per cent to make the results conform to a "probability curve." In the five or six specific challenges within the circle they all finally attained the mastery agreed upon in the course, viz.: 100 per cent in each challenge by the method described above (5). That was only one of many elements entering into a judgment of the pupil's power.

(11) Who is the "poorest" pupil anyhow? The system has not been invented, the professor is still unborn, to tell us what the "fitness" or "capacity" or "potential" is of whipsters 13, 14, 15, or 16, "running at large" intellectually, so to speak. One of the "poorest" in this class the first six weeks became one of the four or five top-notchers before the first half of the year was up. He reminded one of an unassembled Ford at first. He was given a motto, and he worked it out under vigorous social criticism. The motto ran thus: "*The thinker finds a chairman in the mass-meeting of his mind whose duty it is to command all other noisy facts to sit down and be in order. The thinker finds some fact to do senatorial duty.*" This is only a hint as to the desperate responsibility the new teacher will assume in the task of *making* the individual, or in seeing to it that he actually *creates himself by his own activity*. It has always been easy to dismiss the loose-jointed, chattering adolescent from the class and the school. That has been the disposition of those interlopers in the profession who think it to be their duty to take care of the "called and chosen"—a curious survival in this day of democratic ideals and in the light of the cry of the adolescent.

(12) To make an even dozen observations, these pupils did not work merely for the *sake of the loaves and fishes*. There was developed a spirit of challenge and a zest for work and a joy in achievement.

> "A pair of compasses, being asked why, *in order to draw a circle, one foot stood and the other moved, replied,* CONSTANCY AND WORK GO TOGETHER."

The underlying principles of procedure in relation to subject-matter are discussed in Chapter IV. Instead of emphasizing "minimum essentials" under the going machine of assimilation with the conventional drive for uniformity, the aim in all these illustrative exercises is to find a highest common multiple that expresses a community of interests. This position is diametrically opposed to current practices in which the avowed purpose is to establish a least common denominator of social and practical information.

The circle in the illustration stands for that highest common multiple in any working group. The absolutist in education may contend that the radius of any given person is constant. We could agree only on the assumption that it is the business of the absolute *to grow.* The essential point in our view has been stated. A complete circle can be described with a radius of any length, if a centre of constancy is established about which work may be done. This highly colorful figure should find its analogue in all courses in the curriculum.

VII

The new school will aim to delete two major types of waste in our classrooms: (*a*) the waste resulting from the *re*citation of anything perfectly well known by any member of the class, or the *re*citation of things

that are liable to become a bore to members of the class expected to pay attention; (*b*) the waste resulting from asking questions which the teacher knows perfectly well the pupil addressed cannot answer. Stating the issue constructively, the new school will aim to set up an environment in which every pupil has a real job during the entire class period. The objective is the *work spirit*. When that objective is clearly worked out, pupils are not fatigued in the 70-minute class period. Few pupils are overworked.

Exercise.—Three or four paragraphs were written on the board (or mimeographed) without punctuation, capitalization, or paragraph arrangement.

Procedure.—Pupils started at once to rewrite the material, fashioning it into good, if not correct, form. The problem or task was clear. There was continuity of meaning in the material. The teacher had a chance to become a consulting expert while the work was being done. The pupils emerging out of the challenge found other work to do. When we organize our courses under the *problem-case* method, there will be found many opportunities for taking up "unfinished business" with pupils about to "finish their education." No upper limit should be set in such exercises.

In setting out the problem cases in courses of instruction, our hope is that a mere bookkeeping procedure may be escaped. Chapter IV is intended to be an illumination of a way of escaping this dilemma.

It is not necessary to include illustrations of this type of procedure. Any teacher can select good material and cast it up into this "general frame of reference."

VIII

7TH GRADE, JUNIOR HIGH SCHOOL, SOCIAL STUDIES

Challenge.—A study of Alaska and Hawaii.

Procedure.—Pupils worked up advertisements to show some of the possibilities of these countries. A bit of history was in-

cluded. In some cases the pupils designed and produced their posters together; some were done by individuals working alone. The teacher was a consulting expert and a general director. Two or three days were given to this work in class.

Illustrative material, in color at times, was employed, such as a drawing of a mountain or volcano, an ocean liner, an oil-derrick. There were signs of budding real-estate genius in these posters. They were informing; they afforded opportunity for a *functional* review; a basis for the need (social) of correct spelling and good (effective) English was laid. In imagination these youngsters were selling real estate, promoting interest in travel, presenting in attractive forms the productions of these countries.

Review by repetition and mechanical drill was not stressed. The posters were displayed. Every pupil had a vivid presentation of the leading features (as each conceived it) of the challenge. The pupils worked in a "controlled" environment, and yet there was *effective freedom.*

Illustrative Posters:

(1)

OIL!!! OIL!!! OIL!!!

Come and Find Out.

GREAT OIL FIELDS IN ALASKA

FOR LOW PRICES

2000 ACRES FOR SALE

20 acres at $3000

TAKE THE SEATTLE AND PUGET SOUND TRIP. WE PAY YOUR FARE ALL THE WAY.

SEE GREAT FALLS

OIL COMPANY

205 GAY BUILDING.

—Harry (11 years).

(Harry had spelled Puget Sound, "Pugut," and "Youre Fair." The teacher remarked: "Harry, I fear you will not sell your lots unless you mend your spelling a bit." Harry made his own corrections.)

(2)

OFF FOR HAWAII!

The American South America

Just sail away, on a certain day
To the land where the sugar-canes grow,
Where we'll sell you a lot, you'll be glad you've got,
In the place where the soft breezes blow.

2000

Lots for sale

Swimming *Surf-bathing*

Fine Mountain Scenery

Where you can raise:

Sugar,
coffee,
pineapples,
Cattle

Temperature
67°
all year
round

IMMENSE BUSINESS OPPORTUNITIES

Write to Hawaiian Realty Co., Honolulu, Oahu Is.

—MARJORIE (11 years).

Note.—Why not make this type of work a basis for good English expression, instead of seeking to negotiate the ritual of themes and the literary canon in the conventional way?

(3)

COME TO HONOLULU

The capital and chief sea-port
of the
Hawaiian Islands
Only 6 to 8 days from San Francisco
On the best steamship line.
From Honolulu come to the Pearl
Harbor Resort. Only a few miles.
Good swimming and golfing
And a mild climate
Not over 67°
Many picturesque trips can be taken
from the Resort.
If you want to spend a good winter,
Write to the
Pearl Harbor Resort
Pearl Harbor, Hawaii.

—ELEANOR (12 years).

IX

ABOUT 9TH-GRADE ENGLISH

(The underlying procedure is applicable to any year. Throughout the grades and high school some such approach as is illustrated in this exercise is helpful. Upon the introduction of technical grammar this procedure may prove suggestive.)

Exercise or *Problem.*—Building up the compound-sentence idea.

Procedure.—The approach is developed through the activity of the pupil. The notion of independent and dependent clauses is skilfully introduced in class discussion by having pupils respond in terms of things they are actually doing. They are

induced to make reactions of one sort and another, and *then* to relate their activities in words. When two "independent" ideas or actions are hit upon, the analysis is carried forward until it is made clear that two full sentences might have been employed, instead of one, joined by the conjunction. (By the way, the parts of speech can be worked up in vitalizing dramatic presentation. A little play was created by the class in this account. The noun stands forth and presents his function. The pronoun marches out to stand there as a substitute. The conjunction performs a marriage ceremony, and the merry-making ejaculators make the scene a comedy, etc.)

The idea of the exercise is developed in class. Definitions are avoided for the time being. Written exercises in text-books are not used in the early stages. Later they may be used for drill purposes caught up in the game or contest.

The essential matter in this creative procedure in which we shall aim to work with *prospective* intention, rather than *retrospective* intention and reproduction of ready-made forms, is clearly to present the work in a manner that calls for self-activity in the building of sentences to illustrate the compound-sentence idea. The same precautions should be taken at any level of the child's experience in approaching the conventional or formal ways of English expression. This self-creative process should precede the practice of picking out sentences from the printed page (in context) designed to illustrate the compound-sentence idea, or any other grammar idea for that.

The most difficult task confronting the new teacher at this juncture is the home study or out-of-class study or preparation of "lessons." The disposition of "helpers"—parents and friendly counsellors—is, in almost every case, to pass on or over to the pupil a ready-made sentence, either out of a book or out of their own construction, just as pieces of pie are passed around at the table. It is easy to be filled up with the stuff of lessons. It is so easy to engage in *trick* training (protect the word—education). In almost any subject, the "learner" can be trained to respond to signals. Pupils can readily supply themselves with an assortment of sentences for the next day, and remain wholly innocent of the meaning of what they bring into the class under the very common practices of our lesson-hearing schools.

An illustration will help to make clear the difference here be-

tween intelligent home assistance and the corrupting practices of "getting lessons." A little boy, twelve years old, apprised his relatives at the dinner-table that he was expected to invent several sentences for his class next day illustrating the compound-sentence idea. He was inclined to engage his mind in reaching out into space somewhere for his sentences. He was trying to recall an image of the printed page where he might have seen samples. It is a case of the mind reacting in a memorizing school, trying to dig up an old movie film out of the rag-bag of memory. This little fellow was guided in his dilemma. He asked for a piece of bread. His mentor said: "Now, boy, just frame up a sentence on the immediate things you are doing or are about to do." "Just let your mind run on with perfect freedom." This was his sentence: "The bread that I want is white and the butter which I wish to spread on it is yellow." Before the dinner was over the boy had discovered that each member of his own sentence was complex. He diagrammed his sentence and worked out a half-dozen or more in a brief time. He built his own sentences out of his activities. Another illustration, all his own, in this list was: "The pencil (that) I am using is yellow, and the paper which I am writing on is white."

It requires no unique imagery to picture the home in which the performances of parents and friends are conducted when summoned to help Susan, Dick, Tom, and Mabel in the task of getting lessons. The empty vessels are filled. Ready-made facts are funnelled into the mind from without. The "lessons" are handed in the next day. Teachers waste their time in correcting the work of tired and confused parents. The value of good teaching is nullified. There is need of legislation in the nature of "Corrupt Practices Acts" in order to protect the minds of pupils, intellectual "Innocents Abroad," against this pernicious system of acceptance of "educational" goods as a free gift. The boy across the street in the illustration cited in this exercise was corrupted to the very roots, intellectually and spiritually, when his mother (a teacher of the old order) passed over to her dear boy a full line of ready-made sentences for the next day's "lesson." Of course this boy stood up and read his fond "mama's" sentences with much gusto. He was being victimized by a systematic general indulgence at home. (His

"mama," by the way, took the sentences from an old text-book, and there is irony in that performance too.)

Going back to the first boy again, we find another helpful suggestion in the nature of extra-curricular guidance. One morning in the dressing-room, his mentor recalled the work of his class on the compound-sentence idea, and asked him to create a few just for fun. The boy began to reach out again as if something were to be found on the shelf, up in the medicine-cabinet, or behind the radiator. "No, boy, just make them up out of your activity." Soon he said: "The shirt I am putting on is badly faded, and the socks I am about to put on are holey." At once his chattering ran off on a condenser he had made the night before. (All boys take to electricity, if they have a ghost of a chance. It is silly nonsense to suppose interests in radio are native.) "Now, boy, if you want to tell me about your condenser, tell it in a good complex-compound-complex sentence. He did it thus: "The condenser which I made last night works very well indeed, and when I rub my feet (shoes on) on the rug it is charged."

The contrast is dwelt on here, because we are morally certain that no aspect of *directing study for creative thinking* is more crucial than the control and redirection of home study and out-of-class work. The seemingly inevitable tendency is to fall back upon acceptance of ready-made data. It will require years of patient and persistent experimentation to eradicate the disposition to regard "learning" as the acceptance of facts, and to move up to the level of viewing education as the process of analyzing problems in the light of facts.

The important consideration in this exercise or problem is to make sure that the pupil shall begin his sentence-building out of his own (guided) activities. He should be guarded subsequently in any review or reference in order that he may not deteriorate into the practice of the artificial schoolboy who reports in terms of old movie films stored up in memory. The creative work must not cease even in review or drill. Otherwise, the process of instillation will intrude itself with all the dangers of indoctrination. Text-books will not be deleted. They may be used in the game, in the contest, under the spirit and genius of the old spelling-bee of our fathers. The interesting side of the problem lies in the fact that the pupils will be able to exhaust

the material of more text-books than the ordinary school now provides.

Up through self-activity by a creative process into text material and supplementary matter indicates, in a way, the direction of this procedure.

In this exercise or problem carried on for several days as a part of the challenge in the classes studied, diagramming of sentences was freely used. This practice may strike some readers as a bit old fashioned. We are quite sure that boys and girls find diagramming a fruitful practice. A "general frame of reference" aids the mind in clarifying word functions in sentence structure. If it results in a mechanical formalism, may not that result be due to a much more fundamental error or philosophy back of the whole system of education? Any formula may be abused. Any pattern may become an empty form. That fact does not invalidate the formula, either in science or English expression. The psychological import of representing relations in a diagram would seem to be sound. Moreover, the new procedure calls for an enormous amount of work in checking results. The teacher, by "a stroke of the eye," can check the pupil's work on his sentences when they are thrown into a good, clear, differentiating diagram. Besides the economical aspects of the problem, youngsters find real enjoyment in diagramming. The emerging masters in any class group, dealing with the relative pronoun, need not stop short of "Than whom Beelzebub, none higher sat," etc., as a bit of a challenge to their powers, and, as pointed out in our illustrative procedure (No. VI), the practice of scaling the Alpine peaks of difficulties will react beneficially upon every member of a *working, climbing, participating* group.

The pupils were asked to explain the various forms of the compound-sentence idea, taking it for granted that their *audience* did not understand the problem.

John, fourteen, wrote it thus: (Only a sample.)

"Seeing that you know what simple, complex, compound sentences are, I will now try to show you how we arrive at a complex-compound sentence.

First I will write a complex-compound sentence and then take it apart and show you the relation of its parts to one another.

This book which has a green cover on it is torn and I will make a new cover for it. (The boy diagrammed his sentence.)

This book is torn, I will number 1.
Which has a cover on it, I will number 2.
I will make a new cover for it, I will number 3.
Now, 1 plus 2 together make a complex sentence.
1 and 3 together make a compound sentence.
Therefore (1 plus 2) plus 3 must make a complex-compound sentence.
So we draw the conclusion that (*a* plus *b*) plus *c* = ?

So our definition of a compound-complex sentence is simple. Any sentence, part of which is compound and the other part complex, forms a compound-complex sentence. Or, if a part of a sentence is complex and the other parts compound, then we have a complex-compound sentence."

Out of the classes from which this illustrative procedure is developed, some of the kiddies, John and others, made the discovery that (*a* plus *b*) plus (*c* plus *d*) might be used to represent a complex-compound-complex sentence, in which each member of the compound sentence is complex. One is tempted to add a word about the exhilaration of discovery and the penchant for big words in these early, yeasty years of adolescence. Suffice it to raise the query: Why should the "professor" think that he alone has a "vested right" in coining new words? (Incidentally, cross connections can be made between departments. Algebra is not a useless abstraction in a vital school. The teacher of geometry will do well to reciprocate, and make vivid use of the *dependent* proposition and the *independent* proposition when dealing with the *hypothesis* and *conclusion*.)

The nomenclature is not so desperately important, if a *real building process* is being carried out in the mind of the learner. We need to pay attention to conventional forms, but the main thing in creative thinking is to see to it that mere definitions are utterly useless, and that vital principles can be built up in a moving-learning synthesis. Here, as in the case of a triangle regarded as *a thing to think with*, so the diagram or any objective representation in a "general frame of reference" comes to have significance and economy as *a thing to think with*. There is no danger of a mechanical formalism so long as *the instruments of teaching and learning are used in creativeness*.

Starting with individual work in the building of the sentences out of guided action and reaction to suggestion, an interesting and productive procedure may be employed in the form of partnership teaching. The pupils may be paired in the classroom and each may explain and expound to the other his own list of sentences. (A little fellow, only twelve, in the class from which the main points of this illustration are drawn, expounded the compound sentence to a university professor. The professor said it was most illuminating.) Each will profit by the other's production. Variety will be evident, for the pupils have been engaged in a creative opportunity. The teacher moves effectively among the little groups stimulating, guiding, shifting this one and that one into better and better working relations. The visiting spectator will perhaps see nothing in this procedure but a "bear garden." He will fail to appraise what he thinks he sees. He may need to be told that it is the dust of industry and a shared activity—a consummation far exceeding the order of a cemetery for boys and girls cured of the habits of "paying attention" and loyally co-operating with the teacher to put the hour out of its agony. Our spectators, both pupils and visitors, need to be converted into participants. The next step up from partnerships is a grouping of pupils under leaders chosen out of their group. The whole class may come to concerted attention whenever there is need of clarification of organizing principles, or when there has been work enough to make a discussion procedure profitable, or when the game is on for competitive results. A pupil chairman may, now and again, be helpful in a socializing procedure—hardly ever in the recitation system or any form of regimentation. Where the corporate spirit is made the point of departure and the goal (flying goal) toward which we are striving, there are many ways open for participation and for the exercise of alternate forms of leadership. *The spectator will know next to nothing about all this so long as he sits on the bleacher seats.*

Two sets of text-books containing exercises upon a given principle may be used in this partnership way. Two sets (duplicated) of word lists may furnish the teacher a way of partnership teaching and open up the highway to corporate responsibility in the class. It is the way, also, toward a cultivation of self-respect. Emerson can tell us about that. Each pupil in a

partnership arrangement, especially in the sentences built up as illustrated above, has something to contribute quite his own. Uniformity of materials of assignment suggests identity of opinion. That is a stupid thing in any conversational group and equally futile in any situation directed to creative effort.

X

This exercise is selected to indicate procedure. It will be noted that work is described for a period of five or six days. The entire account is given in the form of a diary by a college senior, participating in a 9th-grade class in English. The reader will catch a glimpse of the procedure employed in the school and also some idea of the way of preparing the teacher through participation. The college senior in this procedure (not practice teaching) is never allowed to be a spectator; the purpose is to become a participant.

This class was composed of a staff teacher, thirty-six pupils (9th grade), and three college seniors.

Miss H. is reporting. Mr. P. is the staff teacher. At the close Miss P., another college senior, is given a chance to talk.

To-day at the beginning of the hour, Mr. P. handed each of us (pupils included) a mimeographed class roll. After each name we put the mark that we thought he was worth. The pupils were very hard to mark. Some of them do not often bring themes to read but take an active interest in the proceedings of the class, *i. e.*, Russel never volunteers to read a story, but he comments readily on the themes of others. Last Thursday when I was chairman I asked him to tell a story (he did not volunteer) and he told one of the best that has been told in that class. He is in the geometry class I am in, also, and by comparing the work done in both classes, I think that perhaps he underestimates his ability. I think he is a little lax in doing his work.

Since Marshall is so very interested in his work and takes such an active part in the class work—he always has a story—I think he deserves a very good mark even though his themes show signs of haste.

I do not know what to give Bowen. He is not interested and always does so much to distract the work of the others and to annoy the chairman. If he could be made interested in the work so that he would forget to be mischievous. Then, too, he is at the age when boys are usually "smart."

Florence is plainly not interested. She has no time to waste writing themes. She very seldom comments and never writes, but I think that she could.

I wish Henry would write more. He could write well and he made the best chairman we have had this semester.

Alice and Eunice are, it seems to me, all that we could wish. They are interested and they always have themes, and they read well.

After we finished the grades, Mr. P. assigned the new work. It is to be description, a descriptive paragraph with a topic sentence as the beginning and a general statement at the close.

Then we took a picture and together found all the ideas and then all the events that we could see in the picture. These we listed on the board. Next we picked out the best idea to be used in the topic sentence, and then we picked out the second best idea to be used in the conclusion.

After we had completed this, we all set to work to write the description and this completed the hour. I like the way of assigning new work because when the pupils leave the class they know exactly what their next work will be and they can get the lesson for the next time. It is such a loss of time not to make the assignment clear in the first place.

Many of the pupils were able to complete the description in the fifteen minutes allotted to it. This showed that they worked hard in class.

Henry was elected chairman to-day. Henry makes a very good chairman. He presides with dignity. I think he is the best student chairman in the class. To-day he was very strict with the class, but I think he was right, for the class was very

alive this morning and was hard to hold. Henry did exceedingly well. He would pay no attention to the pupils unless they raised their hands. When several talked at once, he would pay no attention. He settled debated questions with justice and decisiveness. Henry is sometimes a little sarcastic, but as yet it has not got him into trouble in the class.

The themes read were about the fly.

D—Fly	E—Swat	E—Now

In the first paragraph we were to describe the fly in some term. The second was to be exposition on "swatting" the fly. The third was to be exposition about swatting it "now."

Most of the pupils had the correct idea. But the themes were very different. I think we all found this theme very difficult to write. It must be too short and too compact. I think the pupils did very well indeed with the assignment.

I do not think that the class pays as good attention and is more noisy when the subject is assigned. The themes are more or less alike and they get tired of listening to the same subject discussed so many times.

I notice that Russel is beginning to have a theme every day now and he volunteers to read. He also comments on nearly every theme that is read.

Marian read to-day for the first time since I have been in the class. She is very shy and does not read well. She is also *very* sensitive to criticism. She should read oftener and perhaps she would get over it.

To-day we each wrote a theme in class. We took our subjects from two pictures—one was a woman setting the table, the other was a man at his office desk.

D	E	E	C

In the first paragraph we explained the problem, in the second we wrote a paragraph of exposition about one of the pictures,

and in the third we wrote a paragraph of exposition about the other picture, and in the last one we brought both pictures together into a conclusion.

At the beginning of the hour Mr. P. mentioned that the themes were to be handed in and were to be considered as tests. The class settled down to work. There was not a great deal of talking and soon the themes began to be finished. I wrote as fast as I could in order to get mine completed that I might assist in correcting those of the pupils. I corrected several. They all bore signs of haste. Many words were misspelled. One boy (Harry) capitalized his words indiscriminately. He made sentences without either verbs or subjects. I find that the pupils read stories much better than they write them. They write them very carelessly. Many of them do not seem to know much about sentence structure, and many other things about grammar.

It is hard to write themes in class, because there is more or less noise and distraction. Then, too, there is no opportunity for revising and reorganizing them. When I write a theme, I often have to write it all over after the first writing, and reorganize the whole thing.

We began on an entirely new kind of work to-day. The reading of "Julius Cæsar." Mr. P. had the books there. This is a very good plan, for then all of the pupils will have a book when necessary and they will all be uniform. This will be easier to read because you can refer to pages. It is always desirable to use uniform texts in the classroom if it is at all possible.

At the beginning of the hour Mr. P. explained about our voices and why reading is such a difficult matter and what we can do with our voices. He made it as concrete as he could by placing a diagram of a man's head and neck on the board, putting in the lungs, vocal organs, and mouth. Then he explained how the sound is produced and how each individual sound is made. Then he explained about stress, pitch, and amplitude.

We read the first scene of "Julius Cæsar." First the parts were assigned to four boys. They read the scene and we discussed their reading and gave each the mark that we thought that he deserved. Then four girls read the scene and we marked them. Then last we seniors read it.

The class as a whole read well. Some of them read too loudly

but they pronounce well and read with expression. I think that they read exceptionally well to have never read it before.

The class entered on this work with a will. It is something new and they were interested.

We read from "Julius Cæsar" this morning. It was expected that we read Act I before we came to class, but I do not think that many of them did. They mispronounced words that they could have pronounced if they had read it before coming to class. Many of them just read words. The meaning was not clear to them, and so they could not make it clear to the audience. I think that on the whole the class reads well.

Is there any way by which you can make pupils bring their books to class? If they do not, they must look on with some one else, and that causes comment and confusion. And yet if a pupil does not have a book he will get nothing out of the lesson unless he does look on some one else's book.*

We are still reading "Julius Cæsar." The class is still interested in it and all are anxious to take an active part. They are evidently (most of them) reading it over before they come to class. They try to do as well as they can. I have noticed that some of them (those especially that sit near me) are very impatient with those who do not read over their lesson before they come to class.†

They all enjoy reading and that acts as a stimulus to make them read better. Marshall said yesterday: "I can't read well, but I certainly do like to." He is always very anxious to take part and waves his hand frantically. Those who do not often read themes are some of the most enthusiastic persons about this reading. I suppose that shows that they are interested

* The best way to "*make*" pupils do anything is to frame your procedure so *that if they don't do it* they will have cut themselves off from some interesting class performance in which they will earnestly wish they had a part. That is, *bait* them, don't *drive* them. (*Comment by staff teacher.*)

† One of the finest results of this kind of class spirit. (*Comment of staff teacher.*)

in something. Stanley never reads a theme, but he does very well in this.

Miss P., up to this point in her *participation* course was inclined to sit on the bleachers and behave as a spectator. Often it requires weeks to convert the candidate. It is very difficult in some cases to work into the game as a participant. Yet it is our conviction that teacher-"training" institutions should undertake the task of developing teachers who will refuse to rely on status, or authority, or magic, or even *rationalizing* as a basis of security. We need teachers of a democratic temper, teachers who are courageous enough to stand on a demonstrated merit in terms of an honest participation with free minds *working forward* on a challenge or a problem.

Miss P., below, is a shining example of the old order of thinking. The comments of the staff teacher in the foot-notes are suggestive. Suffice it to say, Miss P. did not remain a spectator. When she finally began to play the game, the whole situation and outlook began to take on colorful meaning.

Miss P. is talking now:

We are reading "Julius Cæsar" rapidly in class. Mr. P. or Miss H. assigns pupils to take the various parts in the different acts and then they get up and present the scene or act in a half-dramatic way. No time is spent discussing the scene, characters, or the action. The main purpose of the reading seems to be to get the story. I wonder how many pupils are getting the story. Sometimes, if one is to judge by their reading, it seems as if they weren't getting much out of it.*

* Just wait. (*Staff teacher.*)

Some of the pupils do, however, put quite a bit of spirit into their reading and seem to enjoy doing it. John "waxed eloquent" especially to-day, but he ruined Antony's famous speech by giving it a sarcastic interpretation. No comment was made about this by Miss H. I'm hoping later the play will be studied more intensely and the pupils will be saved from going through life thinking that Antony was sarcastic.*

I see Mr. P.'s idea in going through the play in this manner, but I wonder whether it does not have its disadvantages too. I think the first reading of such a play should be a little bit more supervised. †

XI

This illustration of procedure is also presented in the language of a college senior, participating in a 9th-grade class in English. The conditions are similar to those described in X.

The reader will find an extended explanation of the procedure of which this is a part on page 160.

Miss E. has some interesting experiences to relate. The W. H. S. to which she refers in these two diaries

* Well, now, *Miss P.*, *was* he? John thought he was; you think he wasn't. John's thought was his very own; no one told him how to think it. Is yours your own? I really think that John's power to *have an opinion* is worth more than any conventional notion about Antony's speech which I might pass over to him. If he's wrong, he can change his idea. And maybe he didn't convince the class at all. They *think;* they don't merely suck in passively what some one tells them. But *Miss P.*, *was* Antony sarcastic? (*Comments of staff teacher.*)

† The first reading of any work of literature ought to be a joyous *exploring* trip. And on an exploring trip one doesn't have to see everything there is or to behold in their proper relationships the things which one does see. As for me, deliver me from the "personally conducted" Cook tour through literature. Ultimately we'll get accurately all that any ninth-year pupil needs to have accurately. I don't like to tell pupils what to get from a writing. (*Comments of staff teacher.*)

is the demonstration school of the University of Wisconsin.

Incidentally, X and XI serve to illustrate some real problems in preparing teachers for this new procedure. These two young ladies of the 16th grade, allocated to and *participating with* a class of 9th-grade pupils *at work*, are telling us the most amazing things about their scholarship, ability to cope with pupils for whom inhibitions are removed, and capacity for leadership. These two respondents are perhaps among the top third of more than a thousand college seniors who have participated in the school during the past eight years.

Miss E. presents two of her forty interesting diaries, as follows:

To-day we had a quiz upon the Bible pictures which we have been studying for the last three days. I did not have time to write about all the pictures which my group was asked to write upon, but I knew all those which I had time for.

This picture study has done much toward making me see, clearer than ever before, how important a part in every child's life individual differences play. Now, for instance, as for knowing these pictures, Lazare knew practically every one of them upon the very first day, while the rest of us knew many less; in fact, some of the pupils knew but very few of them. This brings out that very important point, which I think every teacher should know: all pupils cannot and will not advance together; that is, their rate of advancement and of grasping knowledge will be different in every case. If a teacher is going to give every pupil a fair chance to develop, this is one, if not the most, essential point which she should know and understand. She must not expect that every pupil will progress at the same speed as every other pupil, for this will never be true; so she must conduct the class in such a way that all these differences will be met and provided for, otherwise some pupils will not advance at all. Individual differences *must* be understood.

I feel that the method used in the W. H. S. of having the University seniors go right into the class and do the very same work that the pupils are doing is a great improvement over the old method of mere observation and then teaching, for observation can never give a college senior what actual development with pupils can give her. If I had been in the class merely observing and teaching without preparing the very same lessons as the pupils did, I would never have understood these pupils as I do to-day, for since I have been doing everything that they have been doing we have all developed together. I have come to see their good and excellent qualities, and also their weaker ones. I have been able to compare one pupil with the other, and also to compare all of them with myself in regard to the way I have been doing their work. In other words, I have seen development and have taken part in it; I have had real, true experience which is of greatest possible value to me. I have also come to understand my own weaknesses and have learned how these same weaknesses have been met, as well as what has encouraged me and what has discouraged me.

I feel that I will now be able to apply just such things, as well as many more, in my own work to make it most successful. To sum this all up in the fewest possible words, I may say that I now understand boys and girls better than I have ever understood them before, and I have been led to see that if each pupil is going to have a fair chance in the classroom, the teacher must understand every one of them as separate individuals and be able to meet their differences as they arise.*

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*Miss E., you amaze me. For three weeks, or more, you sat in my class and were essentially an outsider. I don't think that you once got into the very heart of anything we were doing. I knew that you

To-day we continued the picture study which we started Monday, and which we are to be examined upon to-morrow. From this very informal study, which we have been diverting ourselves to for the last few days, I have come to see that there are a great many possibilities as to the way in which boys and girls may be taught. These pupils are all showing the greatest possible interest in this present study of the Bible. Of course I know it is something entirely different from what they have ever had before, but still I wonder if we had been given this kind of work when I was in high school whether or not we would have been so enthusiastic about it as these pupils seem to be. This question leads me to take this opportunity to mention another one which I have thought about time after time. I have often asked myself, if I had been asked to conduct my class while in high school, could I, or any of the other pupils, have been able to do so? And again I wondered whether we could have done so if we had been given the same kind of training as these pupils are getting.

The conditions here are so different from the high-school conditions with which I am acquainted, and the pupils seem to offer so many more possibilities than my fellow pupils did, that I cannot keep myself from continually contrasting this method of education with the one which I studied under. These pupils are so anxious to talk and so enthusiastic about all their work that I cannot see how my classes in high school could have been so calm and quiet, for I know that we were real live pupils too. As far as getting our lessons was concerned, I know we all did that, but still I don't think that we ever grasped our subjects as many of these pupils do, for here they seem to grasp every point by the very "nape of the neck," if I may use that term. I feel that this experience in the W. H. S. has been of very great value to me, for it has opened for me an entirely different view of teaching. I have come to see that my high school lagged behind because of the lack of force upon the part of the teachers.

were not wasting time, but were coming along—slowly, very slowly. I feared, however, that you might not arrive anywhere within your all-too-short term with us. But now you truly amaze me and arouse me to admiration; you are now in some respects analyzing yourself and the pupils much better than I myself can. Splendid! (*Comment of staff teacher.*)

I feel quite safe in saying that a teacher makes the school. If she is a progressive and up-to-date teacher, her classes will be such, and if she fails in this respect, the school will fail also. I have become so much interested in Mr. P.'s method of teaching that I am very anxious to get home at Christmas time so that I may visit my high school, and compare the work done there with the work done in the W. H. S.

I am also going to take this opportunity again of saying that I know that these few weeks have done much to develop me. When I first entered this class I felt very self-conscious; in fact, it might be said that I was almost afraid, but now I have come to feel that I have more confidence in myself, possibly I have not yet as much as I should have, but I feel that I can develop it and am doing so. I have gotten so that I liked to be called upon, for the pupils have always seemed to enjoy what I have said, especially when I have given stories, and this has helped me greatly. As far as knowing the different things that come up in the class is concerned, I have often felt that the pupils knew much more than I, but now it seems to me that when some big question has come up that my knowledge has surpassed theirs as it should, but as far as details are concerned, I think they would oftentimes, and have in that case, surpassed me.*

XII

Some one has discerningly suggested that boys and girls would rise to the writing of themes as if to the

* Splendid. You are thinking straight to the point. I like particularly your way of comparing the W. H. S. class methods and pupils with those of your own high school without *belittling* the latter; of course you were yourself there an earnest student; you would be in any school. And there would be many others. But the difficulty isn't with your kind of persons; it is with boys overloaded with dynamic energy and girls overloaded with emotion. What can the school do with them?—your school?—this school? Our attempt is to devise procedure which will help a good high school (or a good teacher) to become better by having a firmer grip, a more versatile approach, and a more productive stimulus toward *all* pupils. (*Comment of staff teacher.*)

manner born if teachers would use the detective story in some such manner as follows: Present the story and situations leading up to the development of the dénouement, and *then* let the pupils unravel or discover the plot, finishing the story in their own ways.

The following illustrative procedure suggests rare possibilities. In a social science class (10th grade) the second chapter of the individual books which the pupils were venturing to write—a chapter entitled "Printing and Its Allied Arts"—the teacher dictated a part of a story under the caption, ZZ. Q4. The pupils took the dictation. The teacher invented his part of the story. More or less may be dictated in this general procedure. Perhaps a sentence or a picture would be adequate in some situations.

1. Part of what the teacher dictated:

I was seated in the stack-room of the library recently, deeply engrossed in reading a book entitled *Comfort Found in Good Old Books.* ..... at a late hour ..... janitor ..... campus deserted ..... as I stood in revery, I suddenly heard a voice ..... "Hello there, ZZ. Q4; you weren't gone very long this time, were you." Answer ..... "No, the boy that took me out ..... left me at the desk. ..... Had finest trip in all my life." ..... Many voices. "Tell us about it." .... Books on printing were talking. ..... ZZ. Q4 ..... "John N. took me out." ..... Mr. B. said it cost $600,000 to build our home. ..... (Many interesting places are suggested.)

2. At this point the pupils began to write their own composition. Only one sample of some thirty interesting productions is appended. Richard carried on as follows, seeking, it would seem, only the "wages of going on" in the spirit of the real hero.

There are 30,000 volumes of newspapers in the library; about 100,000 pounds. In the newspaper-room an old lady told us several things about early papers. The earliest paper they had was published in 1830. You remember that big magazine that so many girls bring to the reading-room. The *Saturday Evening Post*, I think they call it. Well, a man by the name of Keimer had some argument with a man named Benjamin Franklin. Keimer learned through a supposed friend of Franklin's that Franklin intended to start a magazine that year. He decided to revenge himself by getting ahead of Franklin and publishing one himself. When Franklin learned of this action, he went to work for a newspaper and by his skilful writings succeeded in forcing Keimer out of business. He then bought the magazine for almost nothing and changed its name from the *Penn. Gazette* to the name it now bears.

At this point in the story, a thin piping voice rose from a corner in the shelf. "I remember, I remember. I was a young book then and had just come off the press." "What do you mean by interrupting me?" said ZZ. Q4. "If you remember that, you don't belong up here anyway. How did you get up here?" "It's not my fault," said the voice from the corner. "A new careless librarian put me up here. I'd sooner be downstairs anyway. It will kill an old book like me if I'm kept awake many more nights by your noisy chattering." "Well, don't interrupt again," said ZZ. Q4, and he continued with his tale.

We were next told that the first paper to be printed by this company was the *New England Affaires*, in 1687. The next paper was the *Publick Occurrences*, in 1690.

From the newspaper-room we went to the map-room, where we saw the signatures of George Washington and those of the signers of the Declaration of Independence. They had a letter from a man named Adams, too, said ZZ. Q4. They had several early maps of Wisconsin there also. They showed how little people knew about this territory. There was a map made by Joliet which pictured the Mississippi regions (1673). The different regions which were occupied by various tribes were shown on another map. The lady in charge of that room explained that Wisconsin had been admitted to the Union in 1848 and that in 1858 the counties were indefinitely laid out.

We left this room then and went up to the reading-room, but on the way out we glanced into a smaller room in which were collected books and papers that had been collected or copied by Draper. Up in the reading-room Mr. Burke told us that the University subscribed to 1500 periodicals.

We left this room then and went to the stack-room, where we were told that each floor had a capacity of 50,000 volumes of books. There are five floors devoted to books. I learned that we never need fear a fire here because the building was constructed fireproof. The University hires fourteen people at each desk to handle us, and they get very tired doing it when the students are studying for a quiz. At this moment a ray of light came through the window. At this sign of coming day there was a sudden rustle and then all was still.

Observations.—Here is an excellent example of furnishing the mind data to work on, of developing an intellectual method or a way of thinking, and of stimulating curiosity. Instead of asking pupils to go hence, write a theme on this or that barren topic—virtually asking them to lift themselves by pulling on their intellectual boot-straps—or exhorting them to think in a vacuum, the procedure starts with a gripping problem and a supply of material shaped up for further elaboration. Provocative ideas and data are supplied, not to be merely memorized or accepted *as such*, but to be *used* in a learning or building process. It is not a situation in which a lot of facts are learned and *then* a command given to go off and try to think and write.

It is again an application of the essential principles of a new general method of approach. It is in essence the scientific way. Data are supplied. A way of thinking is projected. An hypothesis is set up. As the data are used, the way of thinking is redefined. The goal is *work* with prospective intention.

The apprehension that pupils will not know things of common, social, and practical import need not arise if information is used in developing problem procedures in the way indicated in this exercise. The essence of the problem was disclosed by Einstein in his answer to Edison's adult Binet-Simon test. Einstein said he could not answer Edison's questions, but he said he knew how to go about it to find the answers to every one of them. The capacity and the disposition to use information would seem to be of primary importance, while the mere possession of any facts would seem to be quite secondary indeed.

The illustration discloses the effectiveness of giving artistic social starters. English composition, history, any form of writing offers opportunities for this sort of creativeness. Effective freedom and the release of powers can be best worked out where there is *guided* self-activity within a controlled environment.

A teacher assisted his class in developing the situations, color, background, and spirit of the poem "Barbara Frietchie." He suggested that perhaps the author had written other stanzas than those appearing in the poem. The challenge to the pupils was to write an additional stanza, or so, to this poem. They did it admirably. There is creativeness in such a procedure. It is a valuable thing to do, now and again.

XIII

Film, Slides, Pictures, Etc.

The value of the film as an educational means is not clear. There is need of careful experimentation in its use in connection with courses of instruction. Confident acceptance of the va-

lidity and value of the film is met by honest scepticism in many quarters.

Perhaps a statement of the problem is about all we can safely venture at this time. The passive attitude before the film may be related to the passivity of the "learner" in many other situations. In other words, the criticism against the moving picture on the ground that visual instruction makes no demand upon the audience to do any vital sort of creative thinking is an indictment that may be lodged against many other forms of objective representations of reality. Plato was impatient with those who urged the use of geometrical figures. It seemed to him to be an unnecessary accompaniment to pure thinking. The student before a lecturer may take his mental siesta just as certainly as the movie fan. The printed page is too often viewed with a high degree of passivity. The reader may be a victim of the dogma of acceptance, merely following the printed page with as little productive thinking as the person who follows the film presentation. Paying attention may be a passive, mechanical, inert acceptance of explanation. To parrot abstractions and to absorb opinions may result in nothing more than idle revery. The issue in all these situations is just this: Does the individual behave as a *recipient* or a *reacting agent?* Is he a *spectator* or a *participant?* The recitation, the lecture, the printed page, the picture, the diagram, the stereopticon, the film may all be considered in one of these aspects or the other. The film, like any other objective means, may or not be used in a sound educational way. It should be mentioned, in passing, that it is not essential in every situation that values be reduced to linguistic categories. There are educational values lying in the realm of enjoyment and appreciation.

The constructive attitude toward all these accompaniments of thinking from the simplest diagrammatic representation to the film is to be found in relating these potential instruments of education to the individual as a reacting agent. Otherwise we may have a mere verbalism with no urge to creative thinking. The printed page is included in the series. There may be an illusion in reading words or following a lecture just as in the case of sitting in front of a moving picture. What we hope to say here is that a common problem runs throughout the whole series of objective symbols used to represent ideas.

Examples of procedure in this general field.

(*a*) A teacher of English has made excellent use of pictures collected from such periodicals as the *Saturday Evening Post, Ladies' Home Journal, Country Gentleman.* When the challenge was on to write two-character stories, such pictures as the old man in the attitude of conveying to his pal the size of the fish he was about to catch, David Harum in the horse-trading scene (an old man and a boy), will prove suggestive after a mode of building such stories is developed. The picture and the cartoon can be utilized in productive ways in story writing.

(*b*) In geometry pupils should trace figures in the air now and again to make sure that the figures drawn on paper or blackboard do not become excess baggage. A great deal of motion can be put into mathematics. Seeing the figures with eyes closed is an excellent practice in thinking in geometrical categories. A reliable thinker can make a clear demonstration with a poor figure to "talk to." There is a place for an accurate drawing of geometrical figures, but it is not the most important matter.

(*c*) A similar suggestion may be made about the use of the diagram in English grammar.

(*d*) In the use of slides and stereopticon sets, a very general practice is now being followed in having the pupils themselves work up a lantern talk. They select their own material and are responsible for its presentation. Some four or five pupils may co-operate in presenting the pictures. They should be encouraged to give their work orally without committing to memory the phrasing which they employ. It is a good plan, as a rule, to have all members of the class held responsible for discussion of the topic thus presented. There are many possibilities in this procedure. One boy made a study of sanitation in a class in civic biology. He collected pictures as far back as ancient Greece and combined them in a presentation of the conditions in his own city, using his camera to complete the series.

(*e*) This experiment in the use of the film was conducted in connection with English literature. The film used was "The Lady of the Lake." Two class groups in English began the study of it a week before the film was presented. Two other class groups began the class work on it just after the running of the film. It is not possible to speak with certitude about the

relative values of the film in these two situations. For the former groups the film appeared to be an excellent and vivid summarizing of "The Lady of the Lake." No doubt the situations, scenery, and characters were appreciated and appraised much more vitally for those pupils in the first groups than was the case for the second groups. On the other hand, it seems valid to assume that the pupils who began their work on "The Lady of the Lake" with the film presentation moved forward in the reading of the poem with a keener interest and a better understanding than the former. It is impossible to compare these values. Obviously the same pupil could not report in both situations. One may be strongly tempted to dismiss this particular aspect of the experiment or seek to set up a scale of values and indulge in the measurement movement. The only point of interest we shall urge at this juncture is to assert that in both situations the film seemed to be a valuable instrument. The use of it in either way can be justified. The main fact is obvious: the pupils made an essentially different use of the film in this setting from that of the commercial playhouse. They tied it up in a vital way in a course of instruction and made it serve a purpose beyond that of the spectator. It is again recognized that such a film may serve a legitimate educational purpose when given out of context at the movie house. The general effect may be wholesome and, in fact, contributory to the direct educational processes in the implicit forms of enriching life through enjoyment and appreciation.

(*f*) The film has far-reaching potential usefulness in the study of geography, history, chemical and physical processes, and manufacturing. The physiographic features, beauties of nature, river systems, cities, modes of living, etc., are, beyond question, presented in the film with high skill and incalculable value. So in history. The entire series of processes involved in the production of any one of a thousand substances "created" by the chemist, and the phenomenal side of all sorts of revelations by the physicist and other scientists, can be gripped up in a film and used either as a summarizing statement after study and experimentation or as a projected picture antedating an interesting adventure into some one of these enticing fields. In either situation the film can be utilized to tremendous educational advantage. Manufacturing processes and factory produc-

tion are thrown on the screen everywhere. More explicit use of all such material may be made by a redirection of instructional work in such ways as to make possible direct connections with this new and potential tool of education. We are still pioneering in this new field.

It seems reasonable to suppose that only one opinion about the film as an educational instrument should be given consideration. If it is used in any of the ways suggested, it may be regarded as an invaluable instrument. Perhaps something akin to this conclusion should be said about the lecture. It, too, may be employed in the secondary school to decided advantage. The point to be safeguarded is to see to it that it is used as a means in clarifying or economizing the pupil's productive thinking. The lay of the land, a schematization of the search, a setting-up of the problem, a summarization of the work of a challenge for perspective—any one of these objectives may, now and again, be best realized by a vital lecture procedure. The pupil may be just as passive in the lecture as before the film. If the pupil is transformed from the spectator to the participant, or from the recipient to a reacting agent, the evils of both film and lecture disappear.

XIV

General Science, 8th Grade, Junior High School

Assignment.—Exercises, questions, or problems to be worked out by the pupils both in class and out of class.

Illustration.—(One exercise to illustrate the danger of accepting an answer and the possibilities of creative thinking.)

1. "Will it take more heat to start a ton of coal than a shovelful?"

Procedure.—A boy of twelve began his task at home by asking his aunt (a teacher, formerly) what the answer to the problem was. In a very natural way the answer was about to be passed on. It happened that a third person was present. He suggested a more productive procedure than telling.

"Now talk to your question."

"Read it again very carefully."

The boy read it slowly. Then he began to "talk" to it. "I should think a ton of coal would make more heat than a shovelful," said he. "Now, read it again, and ask yourself whether what you say and what you read have any connection."

A rereading brought the emphasis on the word *start.* "Oh," he said, "I see." "It would not take any more heat *to start* a *ton* than a shovelful. I could prove it. I can take a match and a bit of kindling and start each pile of coal with the same amount of kindling. The amount of heat in each of the two matches used to start the kindling in each case would be the same. The heat in the two heaps of kindling would be the same. And therefore the amount of heat required to start the two heaps of coal of different size would be the same. I think I have a correct answer. Of course the conditions would have to be the same."

Observations.—(1) The boy could have readily assimilated so much as his queasy stomach would bear out of the predigested material (answer) gratuitously offered. Ready-made answers can be transmitted. Pupils can learn to parrot abstractions, but they will never become scientific-minded by that method. They can develop a marvellous capacity to repeat other peoples' opinions. They will not become cultured in any true sense by so doing.

(2) The home-study problem is given a new emphasis in this boy's experience. Work well done in class was about to be nullified in home study by mere passing on of answers. This boy was directed in his thinking by a turn of events.

(3) The *correct* answer in a thinking process is of minor importance. In fact, an incorrect answer is not to be regarded as educational tragedy in a building, creative process. The penchant for "correct" answers has led to trick training. Trick

pupils are not being educated in any true sense. The capacity merely to give responses of approved sort upon signals is certainly not our highest hope for the human mind. The puzzle stage of education is solemnly perpetuated out of a false emphasis upon education as knowing. We have perhaps enough of *knowledge about* some things, but altogether too meagre *acquaintance with* vital matters of life and culture. The boy in our illustration was developing power to think in creative terms in a process of "fumbling and success." To be able to arrive at a tentative answer to the question and to be able to support that tentative position with some "real" reasons are steps the thinker takes in his experimental questing. The *correct* answer is not the crucial matter in this learning stage.

Summary.—The purpose of these illustrative procedures will be realized if they prove suggestive and provocative. "Methods," as ordinarily conceived, are not offered. Further examples are included throughout the argument in the following chapters.

It would be easy to indulge in destructive criticism. That is not our purpose in any statement that may seem to be an indictment of our educational establishment. Every illustrative exercise is intended to reveal some ways of removing inhibitions to thinking, stimulating curiosity, overcoming defense reactions and fear, or substituting for various forms of protective coloring a genuine work spirit.

Instead of setting up a least common denominator of common knowledge and institutionalized values for a going machine of assimilation leading to uniformity, we have sought to present a truer ideal of American life by developing a workable programme within a highest common multiple that expresses a genuine community of interests for any working class group. In the latter view we frankly choose to be dissimilar. Every pupil

is a person, not a number. Out of a guided self-expression, out of a creative self-activity, co-operations are secured. No illusion is entertained about developing thinking capacity, curiosity, initiative co-operativeness, etc. Most of these desiderata will emerge if inhibitions are removed and a controlled environment is fabricated in which effective freedom is made possible.

The disposition to accept our system of education uncritically, or the disposition to be critical and not constructive concerning it, is dangerous. The problem we are facing is not merely a classroom problem. Parents are vitally concerned in the education of their children. They do not deliberately become accomplices in a system of life and schooling that unwittingly "buries curiosity alive."

Beginning with the kindergarten, it provides us (parents) a few hours' relief from our responsibility toward our youngsters. Curiously, the Americans most given to this evasion are the Americans most inveterately sentimental about the "kiddies," and most loath to employ the nursery system, holding it somehow an undemocratic invasion of the child's rights. Then somewhere in the primary grades we begin to feel that we are purchasing relief from the burden of fundamental instruction. Ourselves mentally lazy, abstracted, and genuinely bewildered by the flow of questions from one mouth, we blithely refer that awakening curiosity to a harassed young woman, probably less informed than we are, who has to answer, or *silence*, the questions of from a score or threescore mouths. So begins the long throttling of curiosity which later on will baffle the college instructor, who will sometimes write a clever magazine essay about the complacent ignorance of his pupils.*

The alternative is not to abolish the kindergarten, school, or college. The challenge to forward-looking

* Britten, Clarence, *Civilization in the United States. School and College Life*, p. 113.

thinkers is to build a new technic by which it will be possible to release the powers of the human mind. A redirection, not a destruction, of educational means is imperative. We shall attempt to present both the plea and a programme for a new general method in terms of the learner transformed from a *recipient* to a *reacting agent* and converted from a *spectator* to a *participant.* We shall endeavor to locate the responsibility of parents, supervisors, teachers, and pupils in a community of interests. The organized means of education—the system itself, subject-matter, methods—will need to be vitally related to the proposed procedure.

CHAPTER II

ADMINISTRATION OF DIRECTING STUDY

A New Point of View.—Supervised study has become a familiar term in recent discussions of high-school education. The literature of method is replete with contributions on the various phases of teaching pupils how to study. "Directing Activity," conceived as a means of developing a new general method, is the real title of this presentation. "Directing Study" is a compromise title that will serve to emphasize the fact that the effort here is to present a working basis for a more productive classroom procedure than that which usually obtains under the recitation system. Supervised study is too narrowly interpreted to serve this purpose.

One of the most hopeful departures in these discussions is the evident tendency to *formulate methods of teaching upon a study of the learning processes of children.* The conventional emphasis has been upon the requirements of the logical organization of subject-matter, irrespective of the subjective interests and experiences of the learner.

Suggestive experiments have been made, the results of which are illuminating and have already begun to influence educational practice. As an example of the effect of this type of analysis and experimentation it is interesting to note the increasing disfavor in which the term *recitation* is held. *Hearing lessons recited* is

coming to be considered stupid, mechanical, deadly business. Home study, for the most part, is a myth in so far as those pupils who need it most are concerned. The practice of assigning lessons in a perfunctory manner with the expectation that somehow the lessons will be mastered is the corollary of the *recitation system* which has been perpetuated in the American school under the inertia of tradition.

Supervised study, intelligently directed, bids fair to become the means by which a new and vital conception of classroom activities is to be gained. On account of the various uses of the term it is thought best to limit the scope of directing study to that procedure in the regular classroom which directs the energies of pupils *working forward*. If a distinction is drawn between the *recitation*, as such, and directing study—these two activities constituting the major aspects of the class period—it will readily appear that the latter is the more important when productively developed and controlled. However, in this presentation and interpretation of supervised study, no such separation is contemplated. Directing activity (or study) is meant to be descriptive of a totally different conception of the purpose of the classroom than that which is meant by the recitation.

Before raising the problems suggested in the administration and development of directing study, it may be well to point out, in passing, other uses of the term supervised study.

The General Study Room Merely an Administrative Device.—In all high schools having differentiated curriculums it is necessary to make provision for the free or unassigned periods which fall to pupils some-

what promiscuously. The general study room or study rooms are supervised either by a suitable person employed for that specific purpose or by members of the instructional staff. Obviously, the pupils are concerned with their several individual studies. The only positive direction of study would necessarily be general in character. For the most part routine factors are controlled, such as keeping the room orderly, managing the work of pupils in a general way, seeing to it that each one attends to his own affairs. In so far as this free period supplements home study it is valuable and contributes definitely to the efficient management of the school. Yet, as a rule, the general study room is only a means intended to minister to the effective internal organization of the school, rather than toward the solution of the problem of teaching pupils how best to use their powers in study. In rare cases a supervisor of such a group might be competent to assist a large number of pupils in their individual work.

It is conceivable that a teacher of conspicuous ability, broad experience, and technical skill could direct a relatively small group of pupils in a general study period in which different subjects were being pursued. This has been done successfully in isolated instances. Certain general directions are given to assist pupils in studying any kind of lesson. A teacher, supervising study in this manner, may be able to give specific and detailed assistance to pupils in many different courses, depending upon the extent of his experience and his breadth of scholarship. There is also in this connection valid ground for the assumption that generalized habits of application may be developed. As

a general administrative proposition, however, there is little to be accomplished through the general study room in the development of a special technic of supervising study. The general study room is set apart as a convenient place for pupils to spend their free periods. It will be continued as a means to a definite end quite apart from the issue of directing study as presented in this discussion. Much valuable work may be accomplished by pupils in the study period under the usual type of supervision.

It is doubtful whether the best results can be secured from this general approach. The hiatus between suggestion and performance must be bridged in the classroom. No permanent improvement in teaching pupils how to study is to be expected until teachers grip the problem and develop a teaching procedure that integrates directing study with other essential aspects of the class period.

The Weaknesses of the Conference Hour Device.—The conference hour is sometimes utilized for the purpose of assisting pupils in *getting their lessons*. The limitations of this device are readily apparent. The pupil failing in his work or in need of making up lessons is a candidate for the conference period. The methods of work of the pupils are not scrutinized. The prevailing task is to make up lessons. The test applied is informational. A knowledge of the subject-matter is exacted. In the present writing, of course, no criticism is being urged against the acquisition of information. The only point raised in this connection is that the conference hour is not directed explicitly toward the development of better habits of study. Moreover, most teachers pay little attention to the methods

of work of the good pupils, little realizing that it is just as important to make their work increasingly efficient as it is to be solicitous about the pupils whose work is unsatisfactory. The conference hour offers a limited opportunity to study the methods which pupils employ in their work, not only to discover their difficulties, but also to direct them in the more productive and economical use of their time and energy—including pupils of superior attainment as well as those of inferior ability.

No Existing Devices Really Vital.—Another administrative device is worthy of brief mention. It is the plan of arranging a free period some time in the school-day to which all the class sections of each class period report, respectively, once during each week. For example, the class sections in the first period of the day report on Mondays, not only to their regular classes, but also to the same teachers in the free hour. The class sections in the second period in like manner report on Tuesdays, etc. This plan enables the teachers to meet their pupils one extra period each week in small sections under classroom conditions. Opportunity is offered to develop directed study in a limited way. There are complications in this plan, but on the whole it is more promising than the ordinary conference hour in that all pupils of the class section are included in the plan.

There are other special types of practice and experimentation intended to aid pupils in their study, such as the Batavia plan, controlled home study, the double-consecutive period, no home-study assignments, some features of which are incorporated in the following discussion.

A New Procedure Imperative.—However desirable these various proposals and practices may prove to be in the development of improved habits of study—and no doubt conditions will continue to be such as to render some form of general supervision necessary—the conviction is growing that teachers themselves must become increasingly responsible for the economical and productive application of the principles and methods of directing study interpreted in terms of a new general method. Any external means, calculated to control study, may be conducive to better recitation procedure and also, for some pupils, a far better environment for systematic study may be provided. Much might be said in support of any scheme which is designed to foster independent application, personal responsibility, and individual initiative in the pursuit of intellectual matters. It is not the purpose to enter into the controversy on transfer of training; nevertheless, it is difficult to think of educational processes without including some such by-products as habits of concentration, habits of study, attitudes toward work. If pupils are to be taught how to study, the implication is that a more or less permanent change is to be effected in their habits of study. Whether the principles and conditions under which the best results are attained in particular courses of study can be acquired by formal presentation and study and subsequently generalized is a moot question and may be dropped at once. The point of departure, herein presented, lies in the practicability of the plan of having all teachers develop the essential features of directing study as a new classroom procedure. Instead of relying upon external devices, teachers are to be given op-

portunity to redirect the recitation through internal readjustments—partly administrative, partly and vitally instructional. If directing study is to be developed as a constructive and cardinal factor in classroom procedure, certain modifications in organization as well as in instruction are deemed necessary and desirable.

A Longer Class Period.—The customary class period of forty minutes (net) is proving inadequate in the development of a new type of class period. A double consecutive period (approximately eighty-five minutes) is objectionable as a general administrative practice on the ground that an increase in the instructional staff is required beyond that which the great majority of high schools can support.

A conservative demand would fix this increase in the instructional staff at one-fourth to one-fifth of the present staff. This estimate is based upon the probability that a teacher would be assigned four or five class sections daily, instead of six under the single short class period. Waiving the fact that an increasing demand for better teaching would arise and therefore a correspondingly larger budget, it seems inadvisable to urge the adoption of the double-consecutive period for all courses.

It is doubtful, too, whether teachers generally would be able to conduct the work of pupils profitably for a double-consecutive period four or five days a week in the so-called non-laboratory subjects. This plan has been adopted as a rule in high schools for manual training, domestic science, and laboratory science (two or three days a week) largely as a matter of convenience in working out the daily schedule of classes. Excellent

results have been secured in experimentally conducted classes in other subjects under the double-consecutive period.

All things considered, a class period of sixty to seventy-five minutes seems to be an acceptable working basis for all subjects in the programme of studies, for both the Junior and the Senior High School. If the Junior High School is housed in a separate building, a slight modification in this particular plan may prove desirable. The reason for the broad statement is the fact that the secondary school period comprising the Junior and the Senior High Schools must be treated as an administrative unit in schools affecting approximately 70 per cent of the pupils. Communities supporting high schools of ten teachers or less cannot afford, as a rule, to maintain separate buildings for Junior and Senior High Schools. Moreover, the argument for the six-six division of our twelve grades is too obvious for elaboration.

It will require rigorous methods to establish a uniform class period. In the first place, teachers in all departments may be required to take charge, regularly, of five class sections daily.

No appreciable increase in the instructional staff is contemplated in this proposal, inasmuch as teachers of science, manual training, or domestic science would take charge of one to two additional class sections daily to offset, in part, the reduction from six to five class sections in other departments. Slightly larger sections may be necessary in the latter case. Teachers who have heretofore been favored with three or four class sections, either with the full or partial double-consecutive period, will doubtless enter a vigorous protest.

Readjustment of Subjects to a Uniform Class Period.—The validity of the claims of certain subjects for the exclusive advantages of the longer class period has not been fully justified, although plausible arguments are presented. The effect upon secondary education of allotting practically one-third of the pupil's school-day to manual training or domestic science has not been altogether satisfactory. The home-study problem has been intensified in other departments, both on account of the reduction of available free periods for study under school supervision, and on account of the subtle assumption that pupils carrying three instead of four courses involving home study could devote more time to each course. Not infrequently high-school teachers announce that from one to one and one-half hours of out-of-class study are required in their particular courses, failing to multiply their time-requisition by three or four in order to gain a fair estimate of the time a pupil is expected to devote to outside study. Moreover, the double-consecutive period allotted to manual training and domestic science is effectively developing these subjects along the lines of *shut-in* school activities, whereas by their very nature they should be so administered as to require concrete application in the home. The uniform class period must result either in a corresponding reduction in the amount of credit given or to a type of supplementary home work in connection with these departments. There can be no question concerning the desirability of the latter alternative.

Girls might very appropriately enlist the co-operation of their mothers in the solution of problems arising in cooking and sewing courses. The advantages

would be clearly mutual. Parents encounter considerable difficulty in assisting their children in mathematics, science, and foreign languages.

The case for laboratory science is not so clear. Yet the total time allotted to science will not be reduced; in fact, it will be increased. The distribution of time may present disadvantages in certain laboratory experiments. There are comparatively few experiments, however, which require more than one hour. There is something to be said in favor of breaking down the formal distinction between laboratory work and recitation in high-school science.

Now that the claims of other subjects are being pressed, the demand being that the laboratory method should not be exclusively appropriated by any one or two departments, attention is being directed to the problem of equalizing time-schedule opportunities. The teacher of history, of English, of mathematics, of foreign language, is raising the question, very pertinently, why these subjects should not also enjoy the benefits of "vested interests" in the distribution of classroom time and energy. Many difficulties of schedule-making will disappear with the adoption of this plan. Opportunities for vital redirection of classroom procedure in courses now given a single short period will be offered. The home-study problem may be radically changed in the manner suggested in the latter part of this chapter. The single uniform class period for all subjects, as recommended in this discussion, opens the way for fruitful reforms in high-school education.

A Longer School-Day. — Incidentally the longer school-day is inevitable if the single uniform period is

to be adopted. Six class periods are highly essential in working out the daily schedule of classes. The single forenoon session must go. To carry out this plan the school-day should begin at 8.30 A. M., or earlier, and close at 3.30 P. M., or 4 P. M. (approximately), depending upon the arrangement for the noon intermission and the general auditorium period. It should be readily apparent that any serious and practical consideration of curriculum problems must lead to the conclusion that courses in the various subjects should be given equal schedule advantages if they are to be properly developed. To one familiar with the placement of courses in a time schedule the importance of this point is obvious.

With the longer school-day and class period, stock should be taken of the available time for home study. Not infrequently it is found that no allowance is made for the new arrangement. Teachers have been known to exact of the pupil an amount of work for home assignment that could hardly be done in less than two hours of regular home study, in spite of the fact that the lengthened class period and school-day leave very little time for home study. It is not difficult to estimate the probable time available for home work. For the growing adolescent in the modern home, perhaps three hours could be set aside for home study with the adoption of the longer school-day. Boys and girls need some free time for recreation. The home makes certain demands. Music requires time for practice. There are certain legitimate social demands. Moreover, it is well to bear in mind that there is a proper limit to the number of hours for real intellectual effort. Three hours would seem to be the maximum for home

study. If the senior high-school pupil is carrying four heavy studies, and if one of his teachers clings to the old idea of one and a half to two hours on his particular subject, other subjects will go begging for home study. The specialist is not always mindful of the fact that the high-school pupil has something to do in other directions. In the administration of directed study all these factors call for constant attention. A certain university professor known for his generosity in assignments of work and a relentless insistence upon thoroughness remarked when his students complained that they had no time left for their other studies: "Well, gentlemen, that's my opportunity. You elect snap courses in other departments. You must remember that I am seeing to it that you shall not escape a sound education." This general attitude is sometimes found among high-school teachers. Collegiate practices creep over into the high school. The specialist can easily fail to appreciate the responsibilities of pupils living at home and the claims of other departments upon the pupils' time and energy. It is an exceedingly difficult and persistent administrative problem to work out a fair and equitable distribution of time and energy among specialists.

Even in the 9th grade the major part of real study should be done under the guidance of the teacher. This can be done in the longer class period when attention is directed to the work spirit, with no upper limit set for any pupil in the class group. Is it not possible to master 9th-grade mathematics by actually working at it seventy minutes a day, five days a week? To be sure, some time in the class period will be devoted to drill and general discussion and explanation.

Some pupils will need to find extra time for a real mastery of the course. A pupil confused in a given subject may need to find whole half-days (Saturdays) when he can devote his energies uninterruptedly to the mastery of himself (and the subject in hand). This might well be done in the school under the direction of the teacher. There are teachers who find such a plan highly efficient. Perhaps some objections would be raised to this extra work. This may not be the place or time to suggest a longer school-week. Yet teachers who have utilized an extra half-day on Saturday, now and again, to work with a few pupils having difficulty have found the investment paying dividends in better class work and more responsive pupils. Conference hours after school in the new plan of longer class periods with the longer school-day are not proving satisfactory. It is time for teacher and pupils to shift the emphasis to other things. The Saturday-morning conference in which a steady pull (perhaps exposure in some rare cases) can be had is commended as a possibility for the pupil who is indulging in half-learning or for whom there is no mastery yet.

Adjustment of the New Plan to the Junior and the Senior High Schools.—The uniform class period of sixty-five to seventy-five minutes adopted as a standard for both Junior and Senior High Schools contributes to the efficient management of those schools which include both sections in one organization. Pupils in the first and second years of the Junior High School should do practically all their school work within the school-day. The class period of one hour affords ample time in which to accomplish the desired results. The exercises of the hour are varied. No single activity need

be carried to the point of fatiguing pupils. If manual training, domestic science, drawing, and music are offered, one of these exercises and four major studies would require five hours of the working-day for the pupil in the first two years of the Junior High School. Add to this schedule one hour of directed physical education, and it will be apparent that the school has exhausted its claims upon the pupil's time. It may not be wise to prohibit home study in these grades. On the contrary, any supplementary work of applied or other sort which pupils desire to carry on through their own initiative should be encouraged by the school and assistance rendered when possible.

Beginning with the last year of the Junior High School home study should be expected. The general character of such study has been indicated. Since it is the continuance or completion of work already begun under the plan of directing study, the assignment varies with the individual pupils of the group. Problems have been raised, goal ends or objectives are defined—something toward which to work; some plan of work is presented; ordinarily through the study lesson explicit preparation is made for the advanced assignment and the new work is properly begun under this procedure. Home study can be intelligently organized. The impetus is given under the stimulating guidance of the teacher. Some knowledge of the pupil's methods of work is gained. Assignments may be made on the basis of individual needs.

The Problem of Directing Study Within the Class Period.—Probably more significant than all other factors involved in the administration of this new general method is the treatment of the problem with-

in the class period. It has been proposed that practically an even distribution of time be established between the *recitation* and *supervised study*—whatever the number of minutes allotted to the class period may be. In fact, a rigid arbitrary division has been made in some schools—thirty minutes for the recitation and thirty minutes for *supervised study*. At this point fundamental principles must be considered.

Any formal procedure easily degenerates into a perfunctory, deadening, mechanical performance. An illogical, informal procedure is not necessarily the alternative. A large share of the enthusiasm for *supervised study* has been the result of the conviction that through this activity, properly directed, the *recitation system* might be radically reorganized, if not abandoned, and a classroom procedure substituted therefor which is conceived from a totally different point of view.

If pupils are to "recite lessons" in the ordinary way, receive assignments as usual, be supervised by their teachers while they "learn their lessons" preparatory to further home study and subsequent recitation, there is little permanent value to accrue from the departure. Inflexible daily lessons, the formal presentation of vivisected and comminuted sections of the subject as a daily performance, the reiteration of facts under a system of testing with retrospective intention, are evidences of a mechanically conducted classroom calculated to develop passivity and conformity—a receptive attitude of mind. Hearing lessons recited in a routine fashion cannot be accepted as the best type of classroom activity.

The personal initiative of pupils must be cultivated

and their productive energies developed as well as their powers of assimilation. The "problem method" is capable of extended application. The organization of units of instruction under a problem-solving situation is possible in practically all high-school subjects. What is known as the study lesson may properly take the place of a large part of the recitation in the new class period. The formal presentation of subject wholes, or units of instruction, might very properly occupy the entire time of a class period. For two or three subsequent days the entire class period might be most appropriately devoted to individual work in which the teacher is consulting expert and adviser in work related to the unit of instruction previously presented. Again, it may be perfectly obvious that the situation calls for alternation of class teaching and individual study within a given class period. The teacher must be given freedom to express his judgment in such matters. Flexibility is absolutely essential.

Teaching is, or ought to be, a profession, not a trade. To teach by "specifications" and "blue-prints" is to accept the principles of teaching on a trade basis. The real teacher must develop and display artistic qualities. This means that he must be able to measure the results of his own performances in terms of the effect produced upon the object of education—the pupil. *The class period cannot be arbitrarily divided between two or more activities each of which is a variable factor in a larger unity.* The recommendation is frankly urged that the disposition of the class period be left to the teacher. Supervisors and teachers under supervision should be capable of constructive thinking.

The problem-solving attitude of mind is sorely needed in working out a classroom procedure fully adequate to present psychological and pedagogical demands.

The practice of dividing the class period, devoting one part to formal supervised study and the other to the recitation of conventional sort, is disastrous in many directions. The teacher's work is reduced to police duty; the temptation is to keep order and to command pupils to study with no sense of responsibility for directing action. The pupil is tempted to prove an *alibi* when it comes to any further exertion in study. All the evils of the recitation system are perpetuated.

A New Attitude of the Teacher Toward Pupil and Subject-Matter.—The technic of directing study remains to be mastered. It is a process which perpetually begins. Methods cannot be developed and reduced to algebraic formulæ. Constructive supervision of teaching is the most effective means to be employed. In the professional courses for the preparation of teachers the initial work may be begun, particularly in developing a point of view, and in giving some practice in self-criticism and self-direction. Attention to learning processes as a basis for teaching procedure is a hopeful departure. An examination of the methods which pupils employ in their work is essential. Economical and productive methods must be discovered and pupils must be guided in the acquisition of these better methods of work.

This new general method, intelligently directed, should be the means of discovering to the teacher and the pupils how best to organize, select, and apply subject-matter; how to study to the best advantage;

and how to distribute one's time and energy in the most effective manner. The habits of work of pupils should be studied and, to whatever extent possible, improved by the adoption of specific helps under the teacher's guidance.

The new teacher in this new procedure should recognize the possibilities for excellence in particular lines of achievement among boys and girls. For example, the teacher may not be expected to know as much about wireless telegraphy as some boy, or as much about music as some girl, in his class. There is no difficulty in meeting these situations. The teacher is not expected to be omniscient and expert in every direction. It has been assumed that the teacher should excel all the pupils in scholarship. May it not be a perfectly natural situation to find now and again some pupil or pupils who can excel their teacher in some given intellectual adventure? Why not recognize it? Only a stubborn insistence upon status prevents it. Those who have a large confidence in certain forms of tests and measurements would gain an illuminating experience by giving some tests to both teachers and their pupils under the same conditions. Such a test (the Thorndike *W* test) was given to a group of college seniors preparing to teach English and a group of high-school seniors. The median for the college seniors was higher. But the highest third of the high-school seniors did better than the highest third of the college seniors. In that test one college senior out of twenty-one, and six high-school seniors out of thirty-nine, made a perfect score. (The inference that these tests actually measure capacity is perhaps gratuitous. Such applications as this one may, however, serve a pur-

pose in a wholesome reduction of egotism if, perchance, humility is at a low ebb.)

One is tempted to recommend that the supervisors, educators, administrators, and experts advocating tests and measurements should submit themselves frequently to similar testing with those upon whom they would practice, in order that they might study experimentally their own experience in taking such tests. Prospective high-school teachers ought to know that they are likely to have pupils in their schools who will be able to do just as good work in a new task as the teachers. It is possible, too, that some pupils may, at times, be able to excel their teacher in scholarship. By shifting the emphasis from status to emerging merit this fact may be frankly recognized. For the adult to find a youth more capable than himself in some bit of information or skill is an occasion for developing mutuality and a recognition of alternate leaderships. It suggests also the need of dynamic and active scholarship and a continuous moral analysis of procedure. Improvement of teachers in service through new courses, earnestly pursued, is a means of keeping alive a real scholarship, on-going and self-renewing.

The fact that high-school teachers may have some pupil or pupils in their classes quite as able as themselves in the performance of some particular task suggests the need of emphasizing certain unique functions of the teacher in our new procedure. The teacher ought to become an expert in directing activity. He should be able to excel in the rôle of a kind of glorified referee in the intellectual contest under the discussion method. He should become a lively consulting expert in assisting boys and girls in attacking subject-matter

(problems). He should, in brief, become the recognized general manager of the varied activities of the laboratory-work period, seeing to it that energy is wisely directed and that results are economically and thoughtfully produced. A demonstrated leadership is the special function of the new teacher. Boys and girls are quick to respect capacity of special sort. Scholarship is not less important in this emphasis. A new definition of it is no doubt required. Any accredited form of scholarship, dated in the past, will not be adequate. What is required is a usable scholarship, refertilized and increasing in the interaction of mind upon mind. But, if the new teacher is constantly gaining in special capacity in the administration of our new procedure by becoming more and more expert in managing situations in which there is great variation of individual achievement, securing whatever unity out of self-activity is desirable, such a teacher will be able to exhibit excellence in leadership. That is his special mode of excellence. The pupil who excels his teacher in some other mode of excellence, even scholarship for the time being in some new adventure in which teacher and pupils have an even chance, that pupil can be recognized in the group for his special excellence. In passing, it may be fitting to remark that boys and girls soon acquire ability to detect any subtle dishonesty in the person who undertakes to camouflage his scholarship. The teacher who falls into the habit of saying, "Well, let's look that up for tomorrow," when in a doubtful position as to scholarship, may not expect to be held in the highest esteem as a scholar by wide-awake boys and girls.

A New Attitude of Pupil Toward Work.—This new general method, efficiently directed, should serve to

develop the maximum working-power of each pupil. It may be made the means of eliciting the best from each pupil. A constant stimulus to excel is afforded. A working group, with varying individual attainments, is conceived to be possible in all classes. The procedure founded upon this conception encourages each person to discover economical and effective ways of attaining desired ends. The function of the new teacher is mainly to control situations that give rise to individual challenge, and to guide pupils in their co-operative thinking and doing. The institutional teacher has been concerned primarily with the imposed task. The aim has been knowledge or information as an end in itself, or possibly discipline, with slight emphasis on the content of the curriculum. The methods employed to secure these objectives have been developed upon the theory either of the memorizing school or the mind-training school. The recitation system belongs to these types of schools.

Hearing lessons recited consumes the valuable time of teacher and pupils. The logical procedure is to require the pupil to prepare his lesson outside of class. It is not strange indeed that "supervised study," so called, should be introduced as a substitute for home study and manipulated to all intents and purposes as a part of the recitation system. What is needed is a new point of view. The class period should be a laboratory hour—or, better, a working period to which pupils come as to a place of challenge. The teacher should be the director of thought and action. Surrounded by a wealth of raw material in a stimulating environment, the pupil under thoughtful guidance is capable of developing his maximum working powers. Guidance does not mean mere supervision. It does not mean

that pupils are to be made dependent upon the teacher, nor that work is to be made easy with no difficulties to encounter. Pupils should be assisted in planning their work. They need to be taught to use their powers of observation, induction, and deduction, in particular projects, problems, exercises, topics, and courses.

The immature pupil in isolated home study too frequently energizes far below his ability. He is likely to be confused as to the purpose and value of his efforts. Under the procedure suggested in this discussion the pupil works, for a time, under expert direction. What he does is checked and evaluated. He knows at once whether he is working along productive lines. He is taught to examine data, to think his way through, to arrive at conclusions for himself, and to submit his results to the group in which he is working.

In the senior high school, particularly in the last two years, no pupil should ever be led to think he has finished the challenge. He ought to leave the classroom every day conscious of the fact that he has only begun his thinking upon some vital issue or principle.

School Work Progressively Continuous—Not Divided into Definite Periods of Preparation and Recitation.—The essential feature of the new class period is the procedure of working forward under the direction of the teacher. The subject-matter employed in this departure may not be radically different from that ordinarily used in the recitation system. The nature of its organization and method may need to be changed to meet the new conditions. The unit of teaching will be mentioned later. The emphasis on method should be shifted. Out-of-class study may be continued, the purpose of which, however, will not be primarily that of preparation for subsequent recitation.

An adequate account of the pupil's progress and attainment may be had both by individual checking of results by the teacher and by testing for understanding and facility in further application of principles in class exercises. The efforts of pupils under the new procedure will be evaluated more and more in terms of ability to go forward—ability to make fruitful application of knowledges and skills. (Application as used in this connection includes its practical scope, but refers mainly to learning processes in which a way of thinking is gripped and then used in handling new data and new situations.)

Home Work a Continuation of Study Begun in Class.—Directing study is designed to replace a large part of the old-fashioned recitation and to change the character of home study. In the formal presentation of the unit of instruction under class teaching or the study lesson, the problem is to engage the attention of all pupils in the group. The principles of directing study are based upon a recognition of individual differences. Teachers readily discover enormous differences in performance. This fact alone should modify profoundly the character of home work. It might appropriately be described as *unfinished business*, and therefore a kind of work adapted to individual needs, instead of a common assignment of so many pages or problems for all pupils alike. That which is accurately begun in class and partially worked out may be further elaborated, refined, or verified in the home study.

The Pupil, the Educative Unit.*—In the large high school the practice of classifying pupils in a given sub-

* "The schoolrooms of the land too often present the spectacle of straight rows of identical desks at which sit children of the same age, supposedly endowed with the same instincts and therefore to be treated

ject according to ability is sometimes found. Obviously this cannot be done in the small school, however desirable such practice may appear to be. The accelerant-group idea is an attractive theory. Under *collective* teaching and the recitation system pupils in a given subject differentiate rapidly into two or more rather clearly defined *static* groups. The immediate temptation is to classify pupils under conventional labels, as bright, less bright, and dull pupils. The effect of such classification upon pupil and teacher is not altogether wholesome, although it may seem to be an efficient method. The pupil, once labelled, is usually a discouraged pupil. Moreover, any group or section

all alike. And when the method fails, democracy is blamed instead of the mistaken science. . . . Instinct tends to describe us en masse. . . . Temperament emphasizes the differences. . . . If temperaments could be adequately classified and a method of determining them could be devised, there would be made available an invaluable supplement to the 'intelligence' tests. Until that comes the latter will be used to buttress fallacious arguments." (See Ellsworth Farris, *American Journal of Sociology*, September, 1921, "Are Instincts Data or Hypotheses?")

The theory of instincts together with the recapitulation theory, accompanied by the culture-epochs presupposition, cannot be relied upon to-day as a valid and valuable basis upon which to build educational theory and procedure. The extent to which our whole system of education has been organized upon the hypotheses derived from these doubtful theories can hardly be appreciated. Mythological constructions with a luxuriance of imagery have cluttered up our books on "methods" and "education." This aspect of educational development has been a part of the general disposition to *rationalize* opinion and belief. The scientist has not escaped. Dressing convictions up in the "livery of science" and backing up arguments with "cold figures" are common phenomena in both the "exact" and the social sciences. Wholly gratuitous hypotheses are readily constructed and accepted. The person who does not get beyond the rationalizing level of thinking is easily victimized by a spontaneous train of associations. The modern scientist will not fail to tie up his bias, personal equation, and prejudices in a sizable package and tag it as one set of facts which he must reckon with at every step of his investigation.

of pupils must within itself inevitably develop wide ranges of differences. Logically the scheme of classification cannot be made a success with a division of classes only into accelerant and ordinary sections. The advantages are at best only relative. Any classification presents the old problem of individual differences.

With the pupil, and not the class, *as the educative unit*, the argument for classification in terms of native ability or intelligence is not so obvious. The pupil has no static position in his group, when teaching concerns itself with directing activity by developing situations to which pupils and teacher react under a problem-solving procedure. Each pupil has the opportunity of working up to his best. No one of a top third is limited by the presence of a pupil perchance in a bottom third. The fact that one pupil solves fifty exercises in algebra while another solves only ten, both working under the same organizing principle, does not support the view that these two pupils should be separated. The main point is to have each working up to his best ability.

The indeterminate-assignment idea must find a practical application in this new type of classroom work. The problem does not consist in fixing a minimum content for the class as a whole, but rather in developing a clear perspective which sets no upper limit, at any time, for any pupil. The circle within which work is to be done may be described; each pupil within that circle should be given an effective freedom to work up to his best possibilities.

The adequate teacher needs to think of extending the scope of initiative. The problem becomes increas-

ingly one of finding abundant raw material to meet the challenge and needs of pupils *at work*. Wide use is made of supplementary texts and library, together with laboratory material and original problems and questions. The heart of directing study lies in making the class period productive for every pupil. This end can be attained by having each pupil work up to his maximum throughout the class period.

The recitation system develops a receptive pupil —one who spends the hour in listening, absorbing, paying attention. The plan of directing activity keeps each pupil at the *fork of the road* with a problem or question to be worked out. Each pupil is *using* information, principles, knowledge, in thinking his way through exercises of one sort or another—constructing a story, theme, report, etc.

It is to be expected that pupils should work at different rates. One commits ninety lines while another in the same class commits fifteen lines; one translates fifty lines while another translates twenty lines; one writes a half-dozen stories while another is struggling to turn off one, etc. Who after all does the best? Is it not a question of each measuring himself against his own record? The problem for the adequate teacher is to direct activity. Boys and girls become competent assistants in the proper direction of energy just as soon as the repressive measures of collective teaching are removed.

The pupil as the educative unit does not imply that the ideal situation would be to have a teacher for every pupil. On the contrary, the large class can be handled more productively under *directing study* than under the *recitation system*. Any conclusion that the pupil

is singled out and thought of in isolation is a gratuitous misapprehension of the essential principles of directing study. Under the recitation system the pupil is singled out. The average time for each pupil before the class in the rôle of reciting is about one minute a day in each course, whereas in fruitfully directed activity every pupil in the class is working up to his maximum capacity. The "socialized recitation," at its best, partly describes the new departure. How to secure full participation of all members of the class is the central problem in this new general method of *directing study*.

Discussion is essential. Instead of reciting a common assignment—a minimum essential content—profitable discussion is promoted when each pupil has worked out something of his own to contribute to the discussion of some organizing principle. The pupil in the bottom third should be given an opportunity to contribute something which his superiors have not done. In developing a new principle as a tool for further thinking and use on raw material, all pupils are engaged in a common enterprise. No time is wasted in merely reciting ready-made answers to ready-made questions.

Meeting the Individual Pupil on the Basis of His Own Rate of Accomplishment.—The common problem, subject whole, or unit of instruction, serves to unify the work of a class group. It is within the unit of instruction that recognition of individual rates of accomplishment is urged. Organizing principles of thinking appropriately selected and practically integrated in terms of these teaching units, or units of instruction, must be given major consideration.

Each course within a subject should be restated and organized with reference to a few basic centres. Means or plans of thinking one's way through subject-matter are beginning to receive attention. With a shifting of emphasis from the *memorizing school* and the *mind-training school* to the *thought-provoking school* under the conception of intelligently guided self-expression, these points of organization and methodology of courses of study will gain a new impetus and meaning.

Pupils are not likely to improve habits of study through admonition. Some practical and vital means of gripping raw material must be made available.

Class teaching is economical. It is socially and intellectually desirable. Supervised study, effectively employed, and class teaching are essentially phases of a productive form of classroom procedure, the validity and value of which have been demonstrated in a large number of instances. The one type of activity supplements the other. One may be regarded as a corrective as well as a reinforcement of the other. It is highly important that teachers examine the methods which pupils employ in study, observe the amount and kind of work which they can accomplish in a given time, guide them in the proper distribution of time and energy in so far as possible, and assist them in the development of a more efficient organization of working habits. The aim is to direct study along intelligent and fruitful lines by making explicit to pupils ways and means of planning procedure, of schematizing the search, of handling data, etc. Directing study may be a means in the general movement for the improvement of secondary education.

Directing Study Possible Without Schedule Changes. —For those schools which are operated under a forty-

minute period, much that is urged in this argument may be applied in the development of the class period in a manner that places emphasis upon a problem-solving procedure. The extent and character of home study would obviously vary with the length of the class period. The essential features of a redirected classroom procedure may be developed, in part at least, irrespective of the time element in the class period.

Directing Study a Key to Further Advance in Educational Readjustment and Guidance.—In view of the fact that the longer class period should enable teachers better to evaluate the intellectual and moral traits of pupils, a new avenue of approach to the study and administration of educational guidance may be disclosed. This more intimate diagnosis and guidance should provide a means of a better understanding of the probable potential aptitudes and developing powers of pupils than is possible under the prevailing methods of high-school teaching. The success or failure of pupils might become a symptom which would point to a more rational practice of administering courses of study, not only with respect to teaching *per se*, but, in particular, to assignment and continuance of suitable courses in terms of individual needs. The inference that a pupil who is failing in a certain course should, on that account, be shifted to another course does not necessarily follow. This more intimate appraisal of achievement, working habits, and moral traits of pupils leads to no unvarying rule with respect to selection and continuance of courses, but rather should point the way to a more intelligent placement of all pupils—those of superior ability, as well as

those of mediocre ability—than has obtained under the recitation system.

The mechanical and arbitrary definition of credit units in terms of hours and "minimum essentials"—a system partly enforced, partly voluntary, but altogether unsatisfactory—may not be continued under an educational procedure which fosters personal initiative in a procedure which finds its underlying philosophy in a rational development of the life of each pupil. Different rates of progress, varying degrees of accomplishment, non-uniform amounts of work, are factors to be integrated into the complex educational practice of to-day. These variable factors must be recognized not in spite of but along with the urgent demands for uniformity of treatment of groups of pupils. How to use the available school machinery so that each pupil may be given the maximum opportunity to develop his initiative is the crucial problem in this new departure. The recognition of individual needs within the system of class organization is possible under fruitfully directed study.

The practice in self-direction which pupils acquire in the secondary school should become an important factor in determining life-career motives. To assist each pupil to become increasingly intelligent in making his own choice, in estimating his own opportunities, in appraising his own ability, is a fundamental principle to be observed in explicit attempts to formulate a programme of educational guidance as well as vocational guidance. Whatever procedure contributes notably to a self-realizing process of education should meet with cordial support. Supervised study as interpreted in this discussion emphasizes the cultivation of

personal initiative and self-expression through deliberate methods of directing activity. Pupils are thrown on their own responsibility under a guidance that is not crutching, but stimulating and thought-provoking. The character of their work is scrutinized mainly from the side of doing, constructing, producing, building, thinking. The memorizing school with its recitation system and its devotion to class instruction must be radically changed to meet the demands of this procedure and its corresponding emphasis on individual achievement. This intimate acquaintance with pupils at work under the type of directing study set forth in this discussion may become an important factor in the development of a more explicit form of educational guidance than has hitherto been conceived.

Summary.—Two principles of major importance are suggested as warrant for the position urged: (1) The principle of personal growth, which emphasizes the building of the responsible person; (2) the principle of co-operative thinking and doing in which the emphasis is placed upon the individual as a member of a working group under competent leadership within a controlled environment. By an integration of these two principles the school through its procedure contributes largely to the working out of individual liberty regulated by law. Such a procedure, productively directed, is a means of obviating the deadening effects of regimental uniformity, and also a positive method of deformalizing education, while at the same time assuring a wholesome development of the genius for co-operation through which the highest and best expression of individualism and freedom may be realized.

CHAPTER III

THE LEARNING PROCESS

Hortatory Pedagogical Ethics.—No command is more frequently given in the classroom than this general type: "Pay attention, class!" "Study your lesson!" "Be careful now, Susan!" "Think, John!" Pupils are exhorted to think, to study, to follow directions. Little is known about the actual behavior of the mind in mastering the situation in hand. *How We Think* is the title of a very suggestive book by John Dewey. An understanding and appreciation of the nature of thinking might help many a teacher in the development of special technics designed to assist pupils in the initiation, at least, of effective ways of using the mind. Merely to exhort the pupil to think leaves the situation in a negative state. If the pupil does think after being commanded to do so, the credit for doing so belongs mainly to the pupil. Even so, what is done may be due to something like "the heave of the will." In other words, the results we get by hortatory methods can in no sense be attributed to a deliberate and explicit analysis of study habits or of the way the mind works.

No illusion is entertained that we shall ever be able to examine in detail the processes of the mind, either of our own mind or that of another. In the problem raised here the expectation is that our attitude toward the learner's difficulty may be appreciated, and per-

haps modified, as we learn to apply psychology and related sciences to the art of teaching. The real question is, are we able *now* to analyze the learning process and upon the analysis organize procedures that will enable the pupil to use his powers effectively and productively and somewhat deliberately in the mastery of school problems? Or, shall we go on telling pupils to lift themselves by tugging away at their boot-straps? It may be that we shall get a very short distance beyond the stage of commanding pupils either politely or abruptly "to think" or "to study," until we have built a usable body of new experience based upon a study of the biological foundations of human behavior.

Wholesome exhortation is not to become taboo. Human nature requires an inordinate amount of persuasion. Much that teachers do is done on the "ticklish skin of poor humanity." The good teacher knows how to make use of judicious praise. It is very difficult to teach boys and girls, when their chief object is not to be taught. Let any child who tests low get to know it and we might as well brand him as incompetent. If his school work has been hard before, the pedagogical scarlet letter, *C*, tacked on him makes it more so. "What's the use?" he will say and with it initiative drops out of sight. There is no assurance that education is about to become so scientific and impersonal as to warrant the belief that incentives to work may be dismissed. The cultivation of all those influences which contribute to worthy effort, steady application, relentless concentration should be held in the highest esteem. All those who practise the art of education with real boys and girls know the meaning of this proposition. It is the essence of any social

interpretation of teaching that much stimulation to effort shall be employed. No doubt any adequate understanding of the pupil's study habits will tend to increase, rather than to diminish, the encouragers to work. At all events let us be clear that the pupil is not to be set off in more or less isolation and told to "paddle his own canoe" as best he can, or to work out his own salvation by sheer force of will. Mutuality, a shared life, an honest give-and-take, will be even more prominent in a procedure in which some appreciation of the learner's problem is indicated than is the case in any mechanical theory of education.

Teacher Study.—If a new general method is to be initiated in which an important factor shall be a recognition and appreciation of the learning processes (habits of work) of pupils, then it would appear that teachers should study their own habits of work, their own learning processes, their own intellectual method in order that they may approach this new procedure with some sympathetic understanding of the problem. A popular notion prevails with respect to teaching pupils *how* to study. All sorts of advice have been offered. For the most part rules and regulations have been suggested relating to certain external conditions, such as regular hours for study, favorable environment, proper bodily conditions. Another type of suggestion has been somewhat hortatory in character such as "Read the book," "Concentrate attention," "Use your mind." As stated above, these forms of advice should be continued.

An interesting set of reactions came to the attention of the writer upon the request that his coworkers present a statement of the most significant thing teachers in service might do to improve their teaching.

The report which provoked keenest discussion was this one: "*I find that the most significant thing I can do to improve my teaching is to set myself the task of learning something which is, comparably speaking, as difficult for me to master as the task I set my pupils is for them to master, and in mastering my new problem to make a careful, objective, analytical, and introspective study of my own habits of work in learning what I set out to master.*" To do this heroic thing may be too great a shock to the teaching profession. Actually to set out to learn a new language, or to commit to memory *Paradise Lost*, or to learn to play chess, or to master any one of a thousand things that might be mentioned, and actually to make a study of the method by which this thing is learned, keeping a diary of one's experience—that requires heroism. Yet, may this not be the price we shall have to pay in order to orient ourselves intelligently and scientifically to this subtle and difficult problem of teaching boys and girls *how to study?* It may sound quite dogmatic to assert that teachers will not be prepared to enter into a sympathetic appreciation of the learner's actual problem until they themselves have examined critically their own habits of work under some controlled experiment in the learning process. Nevertheless, it may be urged that reading about a problem of this sort is necessarily academic and prepares no one for an intelligent understanding of the real problem confronting the teacher who would become a director of activity.

In passing, it may be fitting to remark that the child has done considerable thinking before entering school. He is not taught to think any more than he is taught to walk or swim. By the maturing processes of life

under biological principles and social controls these activities develop. We may not teach the boy *how* to swim until he does some swimming, and the essential conditions for that performance are the boy and water deep enough for the operation of the laws of displacement and the stimulus to effort. After the achievement of some kind of walking or swimming something can be done (taught) in respect of changing or modifying the stride or the stroke. The popular notion prevails that boys and girls may be, yea ought to be, taught *how* to study. It may be that we shall have to make a similar presupposition and allege that unless there is studying already going on little can be accomplished in seeking to improve methods of studying. And just as swimming may be greatly improved by proper instruction and training, so studying by the same token may be very greatly improved. Dealing then with the problem of *how* to study means that we do not begin *de novo* with the development of studying or thinking, as such. That is a quality of the human already there, in some measure at least, to be directed into productive lines of response. So much may be assumed for the individual in full and functional possession of his powers. Moreover, some measures need to be adopted antecedent to any effective direction in the *how* of studying, such as having a boy who wants to learn or who wants to be taught. To bring about that state of mind it may be necessary to "adopt the constitution." Effective freedom in learning often becomes possible after that event.

Teaching pupils *how* to study resolves itself as a problem into an examination of the pupils' habits of work and the development of technics by which these

habits may be modified in the direction of economical and efficient agencies in the production of results desired in education. There is no promise here of developing a technic that will enable the teacher to get inside the pupil's mind, somehow, to burnish it up and correct defects real or imaginary. No panacea is being offered in that sense. It is frankly recognized that each individual must know more about his own intellectual method than anybody else. What may be done in controls will be found in the cultivation of those influences which may induce the learner to build for himself his own best intellectual method, his own best habits of work. For each individual must actually create his own personality by his own activity.

Now, the suggestion is urged that the teacher (and the supervisor) will be able to direct the pupil in the building of better habits of work, assist him in gaining a sense of self-mastery and a sense of adequacy in using his mind, teach him *how* to study in the most efficient manner, if he, the teacher, has gained a definite insight into his own habits of work through an experimentally controlled study of some achievement in learning. Two examples of this type of analysis are included here merely for illustrative purposes. They are both rather simple problems; they have the apparent merit of being objectively and, in a way, quantitatively measurable. In other words, the learner may keep a record of successive performances with a bit of tabulation. Introspective notes kept with the tabulations afford material for raising productive questions for discussion of educational dogmas of various sorts.

1. The first one is the recognition of a visual pat-

tern, a simple drawing (meaningless) made up of straight and curved lines with angles in a somewhat regular succession. The figure is exposed for about two seconds some five or ten times in succession with time enough between exposures for the respondent to reproduce as much of the figure upon each exposure as he can. Each attempt of the respondent is recorded on a separate card and turned down after each record is made. After the experiment these cards are arrayed in order and a tabulation is made of the number of "corrects" of straight lines, curved lines, and angles in each attempt at reproduction of the visual pattern. Such notes of the respondent's introspective analysis as can be given are recorded. This experiment in learning is quickly done. It is merely suggestive as to method. Some interesting observations may be made by working rather stressfully the method of analogy. Certain inferences about school practices may be reinforced.

A, p. 97, is the visual pattern used in this experiment. *B* represents the successive steps of a learner in mastering the pattern—an adult of some years of teaching experience and a person of methodical habits. Nine attempts were made.*

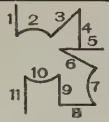
The first part of the pattern was mastered in the first trial to the extent of four lines in correct order.

In the second trial the first 3 lines were held and the 4th lost; difficulty was encountered in the 5th and 6th lines. Obviously attention was being directed vigorously to the middle part of the figure.

In the third trial the 4th line was corrected and

* Judd, C. H., *Psychology of High School Subjects*, chap. III.

A



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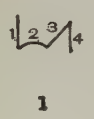
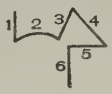
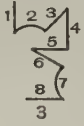


1



2



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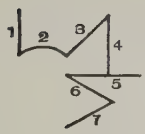
4



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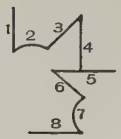

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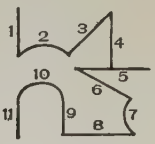

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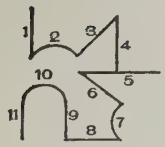

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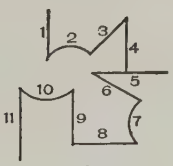

9

THE REPRESENTATIONS IN EACH STEP TELL THE STORY OF THIS RESPONDENT

progress was made toward mastery of the middle part of the figure; the angle between lines 5 and 6 was recorded. Note the fact that lines 7 and 8 are correctly reproduced.

In the fourth trial there is a loss of two points over the third. Lines 7 and 8 do not appear. The central part of the figure is still holding attention.

In the fifth trial a distinct gain is made. Line 5 is correctly reproduced. The gain in the third in respect of lines 7 and 8 is still submerged.

In the sixth trial the pattern is correctly reproduced through the 8th line and it would appear that the lines are now learned up to that point. No breakdown appears in the last three trials.

In the seventh trial, the pattern is completed with the exception of the 10th line; the curve is represented in the wrong direction.

It is significant that that same error recurs in the eighth trial.

The ninth trial resulted in a perfect reproduction in so far as the order of straight and curved lines go and the general form of the pattern.

The respondent was aware of difficulty in the middle part of the figure, beginning with the second trial. In the analysis mention might have been made of the angles and the oblique lines, size of angles and length of lines. It has been thought best to make the analysis as simple as possible.

It is hardly necessary to say that no two individuals would show the same progress in this simple bit of learning. Any one can test it and acquire first-hand data on individual differences. Obviously an array of the results of a dozen individuals would disclose

many points of difference depending somewhat on experience, set of the mind, and all sorts of variables in the human situation. One outstanding feature of them all, however, is a general scheme of mastery; improvement is going on in each one; gains and losses are recorded; the figure is vigorously attacked in some particular part from time to time. As a rule, the first part of the figure is attacked first and some two or three lines of the first part of it are held in correct position throughout the experiment. Occasionally an individual is found who attacks the last part of the pattern first, or selects some striking part of the middle of the pattern. In view of the fact that no two persons work exactly alike, the number of try-outs before a complete mastery is gained varies; in this particular visual pattern the number of exposures runs from six or seven up to twelve or fifteen for persons of about the same general experience as that of the respondent given above.

When we come to the early stages of learning, let us say with the child in his first efforts to master words, no such elaborate organization of experience is found as that for the adult facing the problem of the recognition of the visual pattern. One's orientation to the figure is a tremendously significant factor. Consider, for example, the child's first steps in the mastery of the letters in the word *cat*. He is confronted with a visual pattern quite as complex for him as this meaningless pattern is for his teacher. Up and down, right and left, the order of succession of lines, methods of combining and grouping—all these habits of mind constitute a part of the background for the adult. The child may be only in the initial stages of such a com-

plex organization. Hence, a thing which is perfectly easy for the teacher may be most confusing and difficult for the pupil. *We as teachers need to be reminded everlastingly of backgrounds.*

It will be suggestive to think of each one of the steps in the illustration above as a day, a week, or a month in a *bona-fide* learning enterprise in school, such as nine days in a particular topic (challenge) or principle in geometry, nine weeks in the pursuit of the essentials of English grammar, or nine months in the first year of a foreign language. Some appreciation of the problem of the learner may be gained by working the analogy for all it is worth. May it not happen that the pupil encounters in the fourth or fifth week (step or stage), for example, some confusion comparable to that indicated in the study of the visual pattern? Or may it not be perfectly possible to find the pupil bewildered over the mass of brute facts about the fifth or sixth day in a study of Henry VIII and his wives or what not? To be sure, there is no regularity in the appearance of difficulties in learning; they do not come by the clock at all. This is no time to talk in terms of finality, absolutism, or dogmatism. Only the general scheme of a unit of learning may be laid out. What happens in stages of learning will always be unique. Each individual will exhibit his own mode of behavior; even that will be a changing order. *The individual is too complex, of too multiple warp and woof, for prophecy.* No logic would enable a most intelligent person confronted for the first time with the elements oxygen and hydrogen to predict that, when brought together in a chemical union, water would be the product. It would be just as absurd to try to tell in advance of the

journey what the form of the pattern would be in the fifth or tenth step as it would be to lay claim to an omniscience that would enable one to predict the fifteenth move *ahead* in a game of chess.

This example of learning, above, can be carried through in five minutes. And yet if any one with a pinch of scientific imagination will go through with such an experiment, and reflect upon his own experience in terms of it, a totally new slant on the exceedingly complex problem of learning may be gained, as well as a way of thinking about teaching decidedly productive in outlook. It merely illustrates a possible method. The entire series of trials should be regarded as a unit. If the pattern could have been reproduced upon the first exposure there would have been no problem of learning; the pattern would have been too easy. Viewed as a unit, there is evidence of progress throughout the experiment. There were apparent breakdowns; some things learned were forgotten, to use the conventional pedagogy of the classroom. A truer way to view it is to say that these *mistakes are evidences of progress.* Just what is going on in habit formation and in shifting of attention may not be known. The significant fact is progress toward essential mastery. The exact nature of the processes of organization is not understood.

By using such an experiment as a means of initiating discussion of the process of learning, a whole nest of real problems may be disclosed. The pupil, for example, encounters difficulty in the third week of Hebrew or geometry. Teachers have been known to pronounce final judgment upon the capacity of the pupil to learn it at a corresponding stage in the whole

process or unit of learning. It would be easy to dismiss him from the class. "Take him out. He can't learn my subject. Put him in typewriting, manual training, or cooking. He cannot do synthetic thinking." This has a familiar ring even to-day in the American high school. The analogy may not be overworked if it is suggested that the pupil may be in a stage of learning comparable to the third or fourth step in the case of *B* above. Pupils do not learn the fine points of the game with a regimental uniformity. Just as a boy may work for weeks on the trapeze before he gains a sense of fine adjustment, so he may diligently pursue a new subject like geometry or technical grammar many weeks (six to ten or more) before he begins to see what the thing really means. If each trial for *B* above represented one week's or one month's work in a foreign-language study, stenography, or chemistry, would it not be perfectly clear that mastery does not come in a day, and would it not be equally clear that mistakes and partial achievement are evidences of progress? Certainly the unit of learning should be studied with the utmost concern. *Dismissing the pupils from the course will not improve either the course or teaching.* It is too often a practice by which responsibility is escaped.

Another observation from this simple illustration of a learning process in the recognition of a visual pattern is helpful in every-day teaching. A thing is taught one day with great emphasis; a lucid explanation is made; pupils exhibit every external manifestation of perfect understanding. The next day a bewildering situation arises. Nobody knows anything about it. What was brought out so vividly

seems to have evaporated. Stretching again the analogy for all it will bear, let us consider the matter in terms of the stages of learning in the case of the visual pattern. Suppose the thing in question is represented by the third trial above in which the 7th and 8th lines were learned, and that the fourth and fifth trials above represented the next two days *when the teacher siphons the vacuums in quest of the lost lines* —in quest of the thing so vividly taught only a day or two since. Teachers have been known to grow quite impatient over this situation. The issue is exceedingly complex. So many times we find these new concepts and facts introduced into our classroom work playing hide and seek with each other. It is the way of learning, the way of habit formation. Steady and persistent practice gradually consolidates the lines until the whole stands out in clear perspective. Perhaps we should expect some facts in the learning process (in the mass-meeting of the mind) to stand aside when some commanding fact rises to do senatorial duty. What the pedagogue brands as mistakes may be after all real evidences of progress. The reason for the temporary timidity of a shy fact may be due to fixation of attention upon a vital part of the process quite overshadowing for the time being a non-essential factor, relatively speaking. In the illustration above it is evident that the middle part of the figure was demanding attention. Concentration at the point of major difficulty released the grip on a certain gain in the third trial. Up through the fourth and fifth trials these two items (7th and 8th lines) dropped outside the focus of attention, out in the fringe or twilight of consciousness, perhaps; but they were not lost (for-

gotten) necessarily. In bringing together the items of experience in a new synthesis in subsequent trials, all these apparently forgotten elements were gathered up in perfect order. So it may be in every vital learning process.

It would be a gratuitous misapprehension to infer that such a study as this experiment contemplates would lead to maudlin sympathy or soft pedagogy. On the contrary, a genuine sympathy based upon some shadow of scientific understanding of the nature of the learning process might well be expressed in terms of intellectual severity and uncompromising concentration. The argument is not to accept "mistakes" apologetically, but rather to see them in a much larger matrix of learning than is usually the situation in the daily lesson emphasis.

Let the supervisor and inspector take warning. They may happen round when the learning stages are in evidence only to the teacher, something comparable to the fourth and fifth steps in this experiment. They, too, need to go through this type of critical examination of their own learning processes in some controlled experiment if they would not lose their pedagogical souls. It is so easy to indulge in post-mortems about teaching. Visitors' remarks may be perfectly honest yet inane. Folk, seeing the game from the bleachers, may talk just more or less interesting gossip. They may utterly fail to appraise justly what they think they see; they may not see what they think they see. Calling a thing it does not make it exactly it. The danger lies in the habit of squeezing life into some algebraic formula.

Moreover, the measurer of the product (the results)

of education should be aware of the fact that very much indeed depends upon the stage in which the learner happens to be when examined. The learner would make a poor showing if caught in certain stages of the developing process as indicated in the illustration. It is one thing to measure a product; it is a vastly different thing to guide the learner in the *production* of results. The latter is the eternal problem of the teacher. We should remember, too, that a subsequent performance may be the means of clarifying a previous bit of work. The essential element which might enable the student to hold in solution past experiences may come relatively late in the development of a subject made up of two or more courses of instruction. Algebra, for example, may be an illuminating reagent for certain arithmetical processes; a foreign language may clear up grammatical difficulties in the vernacular.

2. Another example is included for purposes of illustration and method. The digits, 1, 2, 3, and 4, can be arranged in twenty-four different combinations.* Two

* 1342, 4213, 3412, 4312, 2413, 2143, 1243, 2431, 2134, 1432, 3421, 1324, 4132, 3241, 3142, 4231, 3124, 1423, 2341, 4123, 3214, 2314 (1234 and 4321).

If the number of digits is doubled, 1 to 8 inclusive, there are 40,320 possible combinations, not just twice 24. This fact merely suggests the complexity of the problem of learning and the difficulty of evaluating any single trait, quality, or factor when three or more variables are involved. In the attempt to determine *reading ability* it is extremely difficult to weigh three such qualities as *rate*, *comprehension*, *hardness*. There is no graphic device by which to represent simultaneously these three traits. Correlations may be worked out between any two of them. Unless the third factor in every case is checked, the results may be misleading. For example, a high rate of reading with a high degree of comprehension may be exhibited in relatively simple material, or in material that at one time was difficult for the

of these are rejected in the experiment—the 1234 and the 4321 combinations. Twenty-two small cards are used and upon each one is written one of these combinations, as 4132, 3412, 1243, 1342, 2341, etc., until the twenty-two combinations are written. The operator exposes the first card in the series, turns it down; then exposes the second one, turns it down; and before exposing the third one the respondent records the first one. Each exposure should be about two seconds in duration, and the interval between exposures about ten seconds. The second one is recorded after the third one is turned down, and so on through the twenty-two cards. The last card to be exposed in each trial is the first one. By so doing the respondent is holding the last number in mind while getting the next one (the first) on its second exposure. After a few trials, perhaps three to five, the cards should be shuffled so that the respondent may not memorize the

learner, but has become familiar through study. The rate may be very low in very difficult (new) material, and with it a high degree of comprehension. Other possibilities are obvious. No criticism is being raised against standard tests as such. The only issue urged in this connection is the complexity of the problem of learning. In the learning process the ability of the learner in using the capital letter and ability in placing the "sacred comma" in denoting the possessive are hardly comparable magnitudes; the latter may be a hundredfold more difficult at a given stage in learning. After responses are reduced to the copy-mind level a high degree of certitude may be established in comparing results. Tests of all sorts, however, fail to throw any considerable light ahead on the problems of learning. The statistical method is unreliable in dealing with the probability curve. The mathematics of variability or relativity of number is essential in making any adequate study of the relative frequency of traits in a complex. The way a few simple inert digits behave in these kaleidoscopic patterns of number combinations ought to suggest to the student of human behavior something of the complexity of the problem of appraising elements or traits which are in constant flux.

series. The order of the number combinations should be listed in a column after each new shuffling.

The respondent after each complete run of the series of numbers arrays his results opposite the correct list and records the number of "rights" and "wrongs" as well as "attempts." The omission of a digit or the displacement of a digit in the order of digits in a particular combination is, in either case, recorded as an error. For example, if the number is 4132, and the respondent writes 1432, two errors or "wrongs" are entered and two "rights." If the number is 1342 and the respondent writes 4132, three "wrongs" and one "right" will be recorded. One "wrong" rarely occurs. The respondent is directed to write four digits each time, using o if need be to fill in a four-place number (although the o to the left of whole numbers would have no significance mathematically). The o would be rarely employed.

One respondent carried this experiment through a period of five weeks, recording the results of his work and making notes of an introspective character each day. At each sitting the series was run through twice. The percentage of "rights" was 34 per cent the first day. After a period of three weeks' practice the record was held consistently for the last two weeks above 90 per cent of "rights," the highest point being 98⅔ per cent of "rights." No perfect score was made. In this particular curve of learning there was no evidence of an intermediate plateau where the respondent maintained a certain level for a few days. *The level at the end of the period represented a stage in learning in which further practice apparently led to no improvement.*

It is not possible to include any considerable part of the respondent's introspective notes. A few may prove illuminating. Bearing in mind the fact that two number combinations had to be held in memory at every step in the procedure, one progressively disappearing as soon as written, the other appearing at once—a moving series almost kaleidoscopic in character—the reader may know that the respondent finds himself in a state of confusion at the beginning of the practice. There is nothing comparable to beginner's luck in this experiment. The law of chance, whatever it is in this problem,* does not seem to operate in the learner's favor. While it would seem to be a perfectly easy thing to write four digits in some order, the fact of the business is these simple characters seem to contrive to get in the way of each other. The order of the digits in the number combinations, shifting as it does in each new set, requires intense concentration to hold any digit in its proper position.

May it not be that the pupil finds himself in a somewhat similar state of confusion in the initial stages of a new subject when new concepts and new arrangements of ideas come flooding his mind in rapid succession? After the teacher has critically examined his own habits of learning some difficult thing, he, at least, should be aware of such possibilities in his pupils as they set out upon the adventure of mastering a foreign language, geometry, or any new enterprise.

These four simple digits in the experiment furnish a basis for many interesting observations. In scoring the results it will be recalled that the cleavage did not

* The law of chance in this type of problem may be proportionate to the square of displacement. That is not at all certain.

fall between "rights" and "wrongs," as is so often assumed in tests and examinations. The number combinations were not reproduced as wholly right or wholly wrong with any high degree of regularity. Results could be partially correct with many variations.

In measuring the child's spelling, a word is checked off as right or wrong. That is the way the statistical method is operated. The temptation is to tell statistical lies about the learner: indulgence in pathological fabrications is only one step removed. The child spells *arithmetic*, a rith me tec. It is marked wrong despite the fact that three syllables out of four and nine letters of the ten are correctly recorded. Why not weight the results in some such manner? As a matter of fact the word is perhaps psychologically more right than wrong. One syllable or one letter may not be as difficult as another in the word. In the learning process it is probable that equal units of differences will never be established. But, it is just as sound and scientific to weight syllables and letters as it is to try to work out a scale with words as units. To the learner placing of letters according to conventions in spelling may be quite as complicated as the recognition of the number combinations in the experiment.

This dilemma is much more evident in the solution of problems or situations involving several steps in which single stages may in themselves be perfectly correct. In fact, nine-tenths, more or less, of the solution may be correct. To strike it off with a right or wrong appraisal leaves out of consideration the whole business of learning and its psychological implications. Aside from expressing in mathematical, statistical, and quantitative terms the exact and verifiable values

for different parts of any learning process, it must be evident that the elements are in constant flux in the stream of life. *The learner throws down the type, as it were, and reconstructs a new combination or synthesis out of the elements employed in thinking.* One syllable of a word is never just as difficult, nor half as difficult, nor one-tenth as difficult, as another for the actual learner, statistical method to the contrary notwithstanding. If, instead of four digits, the letters of the alphabet are studied in terms of their endless permutations, it would seem a hopeless task to weight the positions of letters in spelling. The alphabetical mind (*i. e.*, the mind that has passed beyond the copy stage and is able to throw down the type and create new words, ideas, etc.) takes care of all that in its own way and transcends any quantitative representation of the process.

The fact that equal units of differences are very difficult, if not impossible, to establish in a learning process is illustrated in the 5th and 6th lines of the visual pattern (p. 97). A simple angle is formed by these two lines; yet note the difficulty the respondent had in getting a correct placement in the whole pattern. In themselves, the lines and angles would have been perfectly easy; *but when simple elements of learning enter into new and complex situations, they do not fall into such simple categories as they do when standing out alone.* The question arises, Is one element in a learning process as difficult as another? Is it not after all a question similar to that of the *chameleon-hued character of words which take on new meaning with every use?* Learning, actual creative thinking, is carried on at the point of crisis, at the point of reconstruction of

experience in endless recombinations and permutations of simple elements.

In a social-practical sense the word arithmetic spelled with a *tec* instead of a *tic* is incorrect. But, in a learning process, the teacher accepts the word as three-fourths correct (in terms of syllables) and proceeds at once to have the child attack the word at the particular point of difficulty. The learner's task is to give explicit attention to the step or stage in which difficulty is encountered. If he spells his *goat* phonetically and arrives with a *gote*, two letters are placed correctly by the requirements of convention, but psychologically the learning act was completed. It is not the learner's fault that society does not agree with him; convention got the learner's *goat* in this instance. There are times when the *copy mind* must be employed in learning. It happens in the spelling of some words. It would be a high type of teaching and learning that would dominate in such matters, in order that the *mirror-minded* pupil should not be developed in all sorts of learning. *Bright* pupils may often be those who merely reflect the printed page and the conclusions of others.

The respondent in the number series soon began to invent devices which might aid him in holding the forms in mind. One device was to use the four fingers of the left hand, assigning to each finger a digit: the index-finger was assigned 1, the little finger 4, and so on. The digit that appeared first on the card (in thousands place) was held in mind by pressing to the table the finger which bore the digit in that place. That seemed to work fairly well for a time. The first digit in the combination was being reported more accurately

than the last. When the attempt was made to extend this device by holding in mind two digits represented by two fingers pressed on the table, the whole machinery broke down. It simply became too complex. The device was carried too far. This experience suggests the possibility of devising schemes of learning which really obstruct the free play of one's powers of mind.

One device which seemed to work throughout the experiment consisted in a rhythmical grouping of the numbers by twos. There was a visible swing of the body in response to this device. For example, 4312 was broken into something like two measures 43 and 12 with an accent on the first part of the measure, as it were. This rhythmic swing was carried out to the last of the experiment. It seemed to become a habit of the respondent to initiate it just before the daily practice was begun. Some set of the mind or mood or disposition may contribute to successful performance and become such a noticeable accompaniment of the act as to be capable of direct initiation. It may mean nothing more than putting oneself in some habitual attitude when learning or studying is the thing in hand.

One other type of introspective analysis is illuminating. Some of the best records of this respondent were made on the days when he went into the practice with a feeling of ineptitude for learning. On one occasion he reported that he started in with a severe headache, yet in spite of it he made a high score. The same thing happened when fatigue was reported at the beginning of a practice. Low scores were sometimes made when he went into it with a feeling of success and a zest for living. All this suggests that we probably know very

little about the situations, physical and biological and social, which actually condition learning.

This example of learning has been elaborated for the express purposes of illustrating rather fully a controlled experiment and of indicating the task involved in a serious attempt at teacher study. One who goes through a learning process with some of these points in mind ought to be able to begin the study of pupils at work with a high degree of intelligence and a wholesome sympathy. The errors of reasoning by analogy will need to be guarded. A new and fresh analysis of one's own behavior should not be neglected. Memories grow dim in time and are readily distorted by repetition. Backgrounds are easily lost.*

A careful study of habits of work in the mastery of any skill or intellectual feat will serve to emphasize the problem of learning. It is difficult to devise methods of representing progress and results in these undertakings. A controlled experiment in which some aspect of the learning process can be delineated in graphical or mathematical terms will perhaps prove most suggestive.†

Undirected Preparation of Lessons.—In the lesson-hearing school with its regimental uniformity the common practice is to assign a set lesson for undirected preparation, usually for home preparation in the upper grades and high school. The class period is used, in large measure, for the purpose of testing the pupils' mastery of the lesson. Recitation and explanation

* Judd, C. H., *Genetic Psychology of Teachers*, chaps. I, VI, VIII.

† Swift, Edgar J., *Learning and Doing*, chaps. IV, V, VI on "Progress in Learning," "Economy in Learning," "Habit in Achievement." Interesting problems of learning are discussed in these chapters.

are employed to assist the pupil toward such mastery as seems compatible with the welfare of the class group as a whole. Much time is given to the reports of pupils upon their preparation.

Let us examine the conditions under which an enormous amount of this undirected preparation of lessons is carried on. If the task is one of memorization, the victim has no way of escape. Nobody can do that for him. It would be difficult to measure the amount of independent study indulged in by the average pupil. His parents assist; his friends do not escape; fellow classmates come to his rescue in many a dilemma. The extent of first aid ranges all the way from a mother's indulgence in writing the theme for her son to giving a mere suggestion in the solution of a difficult exercise in geometry. The memorizing school had one (doubtful) advantage: the student could not resort to vicarious learning. When the school is engaged in testing the boy's preparation of the lesson, it would be well to be mindful of the fact that other persons besides the boy are being tested. Many a fond parent fails in the lesson-hearing school; some succeed admirably.

Injudicious helping of pupils should be obviated. The *mirror mind* fails to detect the essentially new organizing principle or idea of the course of instruction. The habit of assimilating dabs of information for the particular ends of recitation and examination is disastrous to real scholarship, understanding, and independent thinking. The veneer washes off upon the first exposure to the elements. Undirected assistance or inexpert guidance (and this may easily happen in so-called supervised study) develops the

mirror-minded pupil. An astonishing capacity for the sheer absorption of subject-matter may be developed. Many a pupil has memorized by brute Chinese force enough geometry to pass the course. There are those who pursue the subject with no confident hope of ever overtaking it. If the relatively few significant ideas of elementary and secondary mathematics, for example, were actually mastered, much of the confusion of youngsters would vanish. The system of undirected preparation and *re*citation, under the instructional ideal and a haphazard application of the social principle, shifts the emphasis from mastery of fundamental principles to the temporary mastery of "lessons." Information, the facts and materials of instruction are fitted into patterns for immediate consumption. When the patterns are lost or misplaced the pupil is left stranded. Memorizing what is said or taught about a new principle may be done without understanding or thinking. Here lies the danger of excessive telling. What is needed is skilful guidance in the learning process. Somebody ought to be the expert: he should know when to give and when to refuse assistance. Indiscriminate telling blurs the whole situation. To supply a brute fact which will enable a pupil to go further in his thinking is precisely the opposite of what we mean by indiscriminate telling. So long as ability to reproduce information is the essential test of preparation, habits of study will remain unorganized and haphazard. Often the effects of good teaching are nullified by misdirected assistance. *Piece-work done with a blind devotion to set lessons rarely leads to a clarification of principles in any subject.* The disposition too often is to get the lesson, recite upon it, review it

for examination, and then blissfully dismiss it from mind. Lessons may be learned without establishing relations or without gripping principles at all. When the brute facts disappear the fundamental principles slip away also.

The following description of the *mirror mind* is a vivid example of the memorizing school. Four Chinese students in a certain course in a university were suspected of having found some means of communicating with each other in an examination. Their papers bore such a high degree of resemblance that the instructor was quite sure that dishonesty was practised in some mysterious way. He could not decide which paper was the original document or which student was the offender. The instructor, accordingly, set these four students another examination. The results were still in doubt. There was again a high degree of likeness in the papers. There was no chance for the practice of dishonesty inasmuch as the students were carefully policed. Finally an explanation was found. These students reproduced the text-book and the lectures so nearly verbatim that it was difficult to discover any variation in their wording even. The Chinese system of education levies a heavy tax on mere memory. These students were trained to get the exact language and with a marvellous capacity for retention they were able to reproduce lecture and text in answer to examination questions. The secret was out. Here is an example of the *mirror mind* at work in its highest expression.

The pupil may be a prodigious worker in the lesson-hearing school and yet fail to develop individual initiative and a sense of adequacy by reason of the fact that

energy has been consumed in rote learning. The capacity of the human mind to resist the introduction of knowledge is not nearly so remarkable as the capacity of the human mind to absorb an "education" for temporary purposes. Too many students have been crammed, not taught.

Who does not recall the college student who could "sit in" five minutes before the class hour with a hard-working gradgrind classmate, get the main points in the assignment in that brief time, and actually make a respectable recitation with that slender preparation? Who has not met the student who refuses to allow his studies to interfere with his college life until two weeks before the final examination when he buckles down to it and makes the grade, the gentleman's mark at least? Who has not met the pupil who cleverly borrows the ideas (often the written work) of a classmate and presents his results with much gusto and self-assurance? Who has not observed the sharing of interests in a group of busy youngsters just before an examination or test of some character?

In all this there are those who may contend that it makes no difference how the student gets his lesson; the main thing is the acid test of knowing it when called upon to recite it or to write it in the examination. To be sure, everything depends upon the character of the testing and the theory of education upheld. If the mirror type of mind is the aim of education, reproduction of ready-made information, facts, conclusions will be dominant. If independent thinking is desired, procedures of different sort must be worked out. Conventional standardization of thinking has always hindered progress. While it is exceedingly dif-

ficult to secure independent thinking, the necessity of it will not be challenged.

It is both interesting and shocking to examine the methods employed by almost any group of pupils in their preparation of a lesson. In a class of twenty-five pupils in algebra ten problems were assigned for the next lesson. Some twenty pupils reported with the entire number solved. Only two pupils had done all their work without assistance of any kind. It is hardly intellectual dishonesty to receive help from others in such a situation. Perhaps any reference to the moral issue is out of place. Father had assisted son; mother had the experience of renewing her erudition of x; classmate was called up by telephone to give a specific solution to the fifth problem; Mary and Jeremiah, the star pupils in the class, were exceedingly popular just before class was called; the faithful devoured their neighbors' goods. The rapidity with which the solution of a difficult problem travels from mind to mind among youngsters in home preparation is phenomenal when prizes (inverted punishments) and marks are being awarded. Not infrequently the same thing happens in a misdirected socialized recitation. The results of the work of a capable pupil can spread like wild-fire right under the eyes of the teacher.

There is a splendid social comradery exhibited here and a very delightful illustration, too, of mutuality. May this not be after all the real social education we hear so much about in these latter days? Of course the teacher could insist upon absolute independence of work. But the real problem lies deeper. Does a suggestion to a pupil in difficulty destroy that independence insisted upon? Where is the line to be

drawn? Is not the social principle after all the clutch which throws the individual into action? If the classroom is organized under the instructional ideal with an insistence upon regimental uniformity, it would appear that this class in algebra is to be commended in its resourcefulness in the use of the social principle.

May it not be, also, that one of the primary functions of the public school is to keep the home-fires burning *educationally*, so to speak? The good widow, mother of seven and wage-earner, should be given a hearing at this point. She complained to the superintendent, saying that after the hard day's work and after the evening work at home she was finding her educational job rather trying. She said it was difficult to teach her seven children all the lessons assigned them in school by their teachers, now that some of them had reached the high school. Her proposition to the superintendent was that if it was agreeable to him she would be glad to hear her kiddies recite the lessons if the teachers would teach them in the schoolrooms. This shift of emphasis might work.

It would be a distinct loss if the student failed to keep the professor educated. On the whole, the responsibility placed upon the home by our school practices is good for the home. It serves to keep alive an interest in education. Parents find it less of a burden to teach their children or to assist them or to command them to study their lessons at home than to devise ways of taking care of any marginal free time. It may be a bit unfair and too severe criticism to insist that the modern home has abrogated its authority. At all events, the home is quite willing that the school should be exacting enough of the pupils in re-

spect of home study to keep them at some kind of work during those hours of the day when the responsibility of parents for direct methods of educating their children would prove a real task. One criticism against so-called supervised study, mechanically conducted, is the attempt to delete home study. The good widow has suggested a far wiser solution. At all events, our conception of directing activity as the major work of the teacher will in no sense do away with wholesome forms of home work for pupils. Parents will still have an opportunity to participate vitally in the educative process within the procedure proposed under directing study.

Directing Pupils in Work.—In sharp contrast to the general practice of assigning a set uniform lesson for out-of-class preparation and subsequent recitation upon it, let us study a few situations in which pupils carry on their work under the immediate direction of the teacher.

A. (*a*) A class of thirty-seven pupils in geometry (10th grade) began the attack upon some twenty-five original exercises running up into a half-dozen or more rather difficult supplementary exercises. In all, three days were given to this challenge. During the second and third days the procedure indicated below was used. The class period was seventy minutes net. Many pupils were on the job twenty minutes before the class period formally began.

The pupils were directed to work as rapidly as possible and to come to the teacher for consultation when they felt sure they could go no further in their particular exercises. Their work out of class was a continuation of work begun in class. The pupil reported with his work (the case method), indicated his method of work, and pointed out his difficulty if unable to go further.

The teacher used a pad to jot down just what he said to each

pupil or group of pupils. Each one was on his mark; only such groupings were formed as were suggested by the teacher during the procedure for these three days. Occasionally two or three pupils were directed to go to the board and discuss quietly their problem.

The amount of work, that is, the number of exercises mastered ranged from one to ten or more each day. The circle, in other words, was described; each pupil was free within it; no upper limit was set for any one. Some pupils spent the whole class period on some very difficult exercise (for them) at that time.

These notes are transcribed from the teacher's pad. They indicate just what he said to pupils during the last two days of the challenge. The number of the exercise was noted and the suggestion or hint or question is recorded. In parentheses, now and again, the nature of the pupil's difficulty is indicated. The pupil described his dilemma. The teacher observed the injunction of not talking too much. The pupil upon the suggestion went to his seat or to the board and in all these cases below succeeded in demonstrating his exercises.

Ruth. "Try to use supplementary angles."

Margaret. (A defective figure.) "Draw your figure with your instruments."

Oscar. "Talk to your figure." *

Tom. "How did you draw line *AB*?"

Franklin. "Can you see an hypotenuse in your figure?"

M. and *C.* "Work on the size of angles (in degrees)."

H. "Keep one finger on page 62." (A page of summary directions.)

J., *A.*, and *Fr.* (Working in a group. Heated debate. *Fr.* presented one solution of an exercise, *J.* and *A.* another. *J.* and *A.* were pointing out

* One pupil developed the habit of drawing a figure and then talking to it as if it were a kind of personified thing.

the error in *Fr.'s* reasoning.) "Soft pedal it over there." *

Halvor. "Can you make any use of exterior angle?"

Wm. "Supplements?"

A. "Review exercise 120 and try to use it."

Whole Class. (Five minutes.) "Here is an algebraic way of working certain situations you will all need to employ now and again." Explanation and drill.

> If (1) a equals c and (2) b equals d and if (3) a plus c equals b plus d. Then a plus a equals b plus b (by substituting for c its equal a, etc.).
> Then $2a$ equals $2b$.
> Then a equals b.
> Similarly c may be proved equal to d.

"Now apply the principles of this solution to your geometry."

L. (Confused as to hypothesis.) "Read your exercise and trace it in your figure with your finger as you read it."

S. "Apply axiom I to your congruent triangles."

* "Responding to influences from without, life is an unfolding process from within. This is the conception that is now shaping our methods of instruction. The old recognized as training and discipline the so-called voluntary attention which seemed to be mainly the ability to stare, ox-like, a disagreeable, uninteresting, or unintelligible thing out of countenance. The new believes in training and discipline that come from the pupil's effort to follow up from premise to conclusion something which mightily interests him because of its worthy purpose. The new values attainment only as it represents a quality of mind that has acted through its own initiative. The old found satisfaction in a state of mind that was quietly receptive; the new sees hope in turbulence of inquiry; and all of these are irreconcilable differences in kind."—(Jackman.)

Lo. "Surely, any side of triangle may be your base."

T. "Makes with the base an angle? Read it and trace it in your figure. Dwell on it."

O and *H.* "Use another fact stated in your hypothesis. Examine all the data given. Plan a general way of attacking it." *

U. "Tut, tut! You used your conclusion in your demonstration." (Oh, she says. A very common expletive in this procedure.)

A. "Try to think exercise 128 and 131 together." (One is converse of the other.)

M. (Difficulty in seeing related parts in overlapping figures.) "Separate the triangles. Draw them out aside and look at them."

M. "Try drawing bisector of angle. Go back to exercise 119."

H. and *O.* "What did we work out together yesterday?" (The algebraic way of getting quantities equal.) "Apply it here."

H. "Keep one eye on page 59. Something on that page for you. Select two triangles in your figure. You may draw construction lines, you know."

R. "Where is *MN*? I don't see it. Be sure to get all of the facts in your hypothesis. Read it carefully." (Oh, I see.)

K. "What kind of a triangle have you?"

C and *F.* "Select at once triangles which include

* "It (reasoning) is made easier (1) by systematizing the search; (2) by limiting the number of classes amongst which the pupil must search for the right one; (3) by informing him of classes which include the right one and which he would neglect if undirected; and (4) by calling his attention to the consequences of membership in this or that class."—(Thorndike, *Principles of Teaching*, p. 163.)

any parts of your conclusion." (I spent two hours on this one. I have it.) "Fine."

I. "How many sides has a triangle?"

G. "Rub it out, line *HF*, and try to use exterior angle."

H. "Why are those lines parallel? Go back to page 62." (Summary.)

R. "All right so far. Now show what the nature of angles *a* and *c* is."

Fr. "Read your angle there again and point to it as you read it." (Oh!)

J., *M.*, and *I.* "Try to apply this principle: *a* equals *c*; *b* equals *d*. Then *a* plus *b* equals *c* plus *d*. Do you see it now?" (Oh, yes.)

G. "Turn to page 59. There is something there you can use."

F. "Go to board and draw with instruments the kind of triangle you want here. Do it quite accurately."

R. "Suppose you abandon trying to prove figures congruent. What are your alternatives now? Correct. Now which one can you use?"

These are typical hints, helps, questions, directions, etc.

During the third day in this challenge of twenty-five original exercises, Tom and Arnold completed the entire list early in the class period. They then assisted the teacher, taking down on a pad just what they said to a pupil at the point of his difficulty. They did it very well indeed and said they enjoyed it thoroughly.

Here are a few of their notes on what they actually said:

H. "Keep your finger on page 62. Try to construct a line parallel to *CF* and see what happens."

L. "Look up different ways of finding when a triangle is isosceles."

N. "What are the ways of finding quantities equal?"

G. "What do you know about the bisector of the vertex angle of some kinds of triangles?"

K. "What do you know about a perpendicular drawn to a line?"

P. "How do you construct a perpendicular to a line?" "What is the hypothesis in any theorem?" "Do you know what an isosceles triangle is?"

H. "How do you prove two segments equal?" "Why is *BMN* a right angle?" "Why is *CM* parallel to *AB*?" "What do you know about the bisector of an exterior angle of an equilateral triangle?"

Bear in mind these pupils, Tom and Arnold, were doing this superb work in directing activity in a real challenge. They can teach all of us a thing or two. Note the simplicity of their suggestions. Potential Toms and Arnolds may be *realized* in every class. These boys did their assisting with a quiet dignity. Such work may be made a privilege.*

* 1. In considering such qualities as self-direction, initiative, and originality, attention is directed to a positive and dynamic meaning of these traits, such as Thorndike so effectively describes in *Teachers' College Record* 17, p. 405 *ff.*, 1916. "The view is to think of independence, not as unreadiness to follow or obey or believe in other men, but as a readiness and ability to contribute to good causes something more than is suggested by others; to think of initiative, not as an unreadiness to wait or co-operate or be modest, but as a readiness and ability to move ahead, 'speed up,' lead and take promising risks, and as an attitude of

(*b*) The same class in geometry as in (*a*) above.

The following exercise was begun in class by all the pupils with the expectation that each one would have a chance to do his own thinking. Habits of work were examined in so far as it was possible to do so. The teacher sought to discover the particular difficulty each pupil encountered and to check the work as rapidly as it was done. The following notes upon each pupil were gathered in about twenty minutes. An attempt is made here to record some points about the work of each pupil.

Exercise. (All on your marks now!)

"*If two opposite angles of a quadrilateral are equal, and if the diagonal joining the other two angles bisects one of them, then it bisects the other.*"

The pupils were directed to begin this new exercise at once, work as rapidly as possible, and come to the teacher at the point of difficulty. The teacher was active in discovering what the particular difficulty was, and his procedure was to make only a suggestion, ask a question, give a hint.

1. William's first difficulty was in knowing what is meant

expecting to create opportunities, and do ten dollars' worth of work for a dollar. Originality must not mean weakness in doing routine work in old ways, or any essential dislike of traditional knowledge or customs as such or any paucity of fixed habits—but strength in doing work that is new or doing it in new ways, an attitude of hoping to change knowledge or practice for the better, an organization of habits that causes their progressive modification. . . . The dynamic opposite of originality is not efficiency, but stupidity. The dynamic opposite of efficient routine is not genius, but disorder. . . . Finally, will it not clear the whole argument somewhat if, in our own thinking about education, we replace the word 'self-reliance' by *reliance on facts;* 'self-direction' by *rational direction;* 'initiative' by *readiness and ability to begin to think and experiment;* 'independence' by *readiness to carry thought or experiment on to its just conclusions despite traditions and customs and lack of company.*"

by opposite angles. He stumbled on the distinction between *successive* and *opposite* angles.

2. Margaret was on the whole the best thinker in the class. She had written four perfect "examinations" in the first eight weeks of her geometry, and her daily work was invariably excellent. Her difficulty in this exercise was in the antecedent of *them*. She carried it back to the first dependent clause. When the teacher asked her to relate her pronoun to some other possible antecedent, she found the solution perfectly easy.

3. Frances, a very good pupil, read the exercise and began the demonstration by drawing an equilateral triangle. "Quadrilateral" was translated "equilateral." When she discovered her initial error she sailed on without difficulty. She probably discovered her error in trying to draw diagonals of an equilateral triangle. Was her difficulty a failure to read? Hardly. She caught lateral in quadrilateral by the tail of her eye and did what every one who really reads does: she filled in meaning out of her head. Did she think? The fact is she perhaps did think *too much*.

4 and 5. Kenneth read the exercise four times and remained wholly innocent of the meaning of it all. When prodded to draw a figure which seemed to be suggested by these words of telegraphic brevity he got under way. Jim had to have four or five additional social starters before getting to the point of understanding what it was all about. By that time more than half the class had made a complete demonstration of the exercise.

6. Henry met his Waterloo on the word diagonal.

7. Mary wrestled with the two dependent clauses, and as soon as it dawned upon her that each one gave her the basis for a statement in her hypothesis in terms of her figure, the rest of it was very quickly done.

8. Mamie read it and represented it in a figure as she read it and solved it without hesitation.

9, 10, 11, 12, and 13 indicated experience similar to that of Mamie.

14. Oscar, a very cautious thinker, grew a bit timid in attacking the triangles formed by the diagonal. He was perfectly clear in his intellectual method at the point of hesitation. He had in mind two alternatives. He wanted assurance in his next

step. When told that either alternative would bring him safely to a correct conclusion, he became confident of his ability to go forward.

15. Loraine made a false application of one of the ways of proving triangles congruent. A hint, and she corrected her error.

16. Lorna slipped on the meaning of an included angle.

17. Tom had missed a corollary on account of absence. He was directed to turn to it and master it then and there. He did so and made use of it within the first ten minutes of work on the exercise.

18. Arnold did the work quite accurately, but he made of it a very long proof. A suggestion at one point in his proof, and he at once made a short-cut proof.

19. Pearl was dazed before the array of conditions, apparently unable to grip the thing at any angle. She merely got started in the time allotted for this experiment.

20. Mildred, a very dependable thinker, was not quite sure of homologous angles in her figure. By "a stroke of the eye," as it were, her difficulty cleared away.

21. Helen, a rather silent partner in the procedure, responded when asked how she was getting on, that she felt sure of her method of attack.

22. Melvin seems perfectly happy in bearing lightly the sorrowful burden of human knowledge. He is content to be a mirror mind, carelessly reflecting what he picks up in haphazard work. As soon as the solution of the exercise was presented, he absorbed it and was prepared to give it back just as he received it. He manifested practically no initiative, even though he read it several times like a good little boy obedient to authority.

And so on for thirty-seven pupils in this particular class.

The striking fact about this type of analysis of the habits of work of any group of pupils is lack of uniformity of achievement. *No two pupils needed the same treatment.* It would have been absurd to call the attention of the entire class to the difficulty which

Frances encountered in the word quadrilateral. *Why fuss the other members of the class with the particular difficulty of a single pupil?*

Yet that is precisely what is done in the recitation system. The attention of the entire class is arrested by some unique response of the pupil called on to recite or to relate his particular progress and difficulty. There is a time for class discussion. Again, any extended explanation in the situations just cited could hardly be justified.

Difficulties do not come to any class group by the clock. Difficulties are for the most part individual. The same individual does not respond with a high degree of uniformity from day to day. The teacher who has developed the experimental attitude of mind may find some such study of habits of work as this one a profitable departure on many occasions in directing activity in teaching. Such an exercise conducted in a controlled environment enables the pupil to do independent thinking, or rather, let us say, rationally dependent thinking. May it not be a real beginning in creative or scientific thinking?

A year after taking their geometry some pupils were requested to make a frank statement about the general procedure illustrated in this class. Two pupils responded as follows, fifteen and sixteen year old pupils. These statements are decidedly original and first-hand. They express very clearly the procedure. No apology is offered for including them. Pupils are not lectured to about any particular intellectual method.

"I like your system of 'challenges' very much. It gives the student responsibility and a greater opportunity for initiative.

Class *work* rather than recitation makes individual help possible; for instance, student *A* may understand certain principles very well, while student *B* does not. Then the instructor has time to help *B* out of his difficulty without holding *A* back. Perhaps next time, vice versa. By a class recitation held, say once in two weeks, the work of the completed challenge can be summed up, thus testing each student. This system also develops competition, and 'emulation among students incites to industry.'" —(L. O.)

"Each person has a different method of learning a subject. In geometry one person may learn by repeated application, another by finding the reason behind each theorem. The teacher has to follow the system and thoughts of each individual in the class. The challenges offer a splendid opportunity. In every geometry class there will be a certain number of pupils who learn by application. Part of these will be able to work ahead by themselves when a certain goal is given them. The other part will not grasp the subject so easily, and the teacher can give them help individually or as a group without keeping back the first group. The same will apply to the group which has to find the reason before they can apply the theorem. In this way every person is progressing as rapidly as possible without retarding another person. Then, when a certain part of the subject has been studied, to have a general discussion clears up every point, and every one is ready for a new phase of the work." —(R. N.)

B. Class in biology, twenty-six pupils, 11th and 12th grades.

In preparation for this experiment the class (juniors and seniors) had worked out a set of experiments on osmosis and digestion (covering four days' work) so that they fully understood the following definitions: "Osmosis is the interchange of liquids of different density that are separated by a plant or an animal membrane (cell-walls). In the process of osmosis the greater flow is always from the less dense to the more dense."

"Digestion is a chemical change whereby soluble food substances are made ready to pass through cell-walls or made ready to be used in cells."

The first question was given, answered by each on paper.

No class discussion followed. Students were then asked to write out thought processes.

The second question (more difficult than the first) was given with the understanding that they were to analyze their processes.

As a teacher, it is helping me greatly to realize how my individual students think. It will help me in directing their thought processes in the future.—(Teacher, L. W.)

a and *c* in each case below are the answers to the questions, *b* and *d* the pupils' analysis of their intellectual method. The questions are not repeated. Only six typical reports are included; one record of a college senior participating in the class is included. Answers are not edited.

I. (*a*) *Why will dried raisins and prunes become filled when you put them into water?*

They will become filled because water will pass through a membrane, and the water seeps into the cells through the cell-wall.

(*b*) The first thought I thought was whether the raisins and prunes were cooked or not. They were not. If they weren't cooked the cell-walls must still be there. Water will pass through a membrane, and cell-walls are membranes; therefore water must pass into the cells, or, in other words, water passes into the raisins and prunes and fills them up.

(*c*) *In order to cook meat to obtain rich soup or broth how would you prepare it?*

I would pound the meat first and then cook it so that the broth could escape from the meat.

(*d*) I first thought what makes broth. It must be the substance contained in the cells. These would burst anyway in heating, but if I broke the cells first more of the substance could escape in the time allowed for the meat to cook. Then I thought: "Why wouldn't the water seep into the cells, as the water is less dense than the substance contained in cells and the flow is always from the less dense to the more dense?" This could not happen, because for the process of osmosis a cell-wall or membrane is necessary, and I had broken the

cell-walls by pounding. Therefore, my answer is proved.—(F. S.)

II. (*a*) As the sap in the cells is denser than water, the water enters in by the process of osmosis. The skin acts as a membrane through which it passes.

(*b*) 1. By the experiments that preceded.
2. By the results of one certain experiment which explained it.
3. By a certain definition whose contents applied directly to the thought.

(*c*) I think I would let the meat stand in water for a little while so as to let as much water enter as possible (by osmosis) before boiling. As we know that in osmosis the interchange is from both sides, we would get a little of the cell-sap out before boiling. I think I would then boil in the same water so as not to lose any of the sap. Boiling will break up the cell-walls by expansion of steam, as the water in the cells would produce it. When the cell-walls are broken the rest of the sap would come out. You ought to have good soup, as you would have practically all of the cell-sap.

(*d*) In answering this question it brought to my mind several things which have been proven in class. The first would be the process of osmosis, by which the water would bring out the cell-sap.

Second was the effect of boiling on the cell-walls.

Third was what was going to happen to the sap if they were broken.

Fourth, as you would have almost all of the cell-sap, that you ought to have good soup, seeing that all soup was is cell-sap of the meat which contained the flavor.—(A. S.)

III. (*a*) They will become filled up, because of the process of osmosis which takes place. The less dense water goes through the membranes into the denser syrup in the fruit.

(*b*) We are studying osmosis; therefore, I immediately thought that the question had to do with osmosis. My mind wandered back to the kitchen at home, and I saw a pan of raisins soaking in water. My mind exaggerated

the action going on in the pan, and I saw the water soaking into the cells in the raisins. Therefore, I concluded that for that reason the question was proved as I answered it.

(*c*) In order to cook meat for the purpose of obtaining good, rich broth, how would you prepare it?

I would allow the meat to remain in cold water for an hour or two in order that osmosis might take place. Then in cooking I would not allow the soup to boil, as it would break up the cells of the meat, and it would become tough.

(*d*) Remembering the test with potato, I figured that as for potato, so must osmosis take place in meat. Then when the home work on boiling potato was reported on, they proved that boiling caused the cells to be broken up, and if this happened the osmosis which took place would have been of no value.—(P. B.)

IV. (*a*) Here we have the cell-walls—which are the membrane and liquids of two different densities. The water inside the raisins (cell-sap) and the water outside. The water being less dense than cell-sap—the larger flow will be into the cells—thus filling each one out. Some of the cell-sap will come out, because in osmosis there is always an *interchange*, but this will be negligible compared with the inward flow.

(*b*) First of all I collected facts learned in other experiments which I thought would help work out this one. I then modified these facts so that they applied directly to the question at hand.

(*c*) To get broth we must so cook meat that all the juices will come out. From our osmosis experiments we know that when liquids of two different densities are separated by a cell-wall or membrane the flow of the less dense is always the greater; in order to attain our end we must prepare a solution in which the meat will be cooked; that is, denser than the liquid in the meat. Thus, the juices in the meat will flow out, while there will be little of the flowing in of the denser solution.

(*d*) (1) *First of all I got an hypothesis; that is, something from which I could start and to which I could add facts.*

(2) Then I went back to the osmosis experiments—because of the similarity I saw between these two problems—I dwelt especially on the experiment in which a potato was placed in salt water.

(3) I then worked out the similar points in these two experiments, and so modified my terms and ideas that they fitted directly the experiment under discussion.—(H. F., a college senior participating in the class.)

V. (*a*) The raisins and prunes contain or are made up of tiny cells. The moisture in these cells is much more dense than water. Water will pass into the cells of raisins or prunes on account of it being less dense than liquid left in raisins, because osmosis takes place from the less dense liquid to the more dense liquid. If salt water (rather strong) were used instead of pure water, water would probably not be *absorbed* by prunes or raisins.

(*b*) Things I thought of when I wrote the above explanation (in order).

1. Cells of raisins and grapes, when dry.
2. How cells may become enlarged by water.
3. Osmosis through the cell-walls.
4. Density of water compared with liquid left in dried raisins.
5. How experiment would work if a liquid with greater density were used.

(*c*) The meat should be cut up in pieces not larger than a fist or in chunks of not more than one-half pound each. Place it into a kettle and pour on it some cold water. Cold water should be used instead of hot water because it will pass into the cells of the meat by means of osmosis, while hot water would cook the cell-walls, and therefore would not permit the water to enter the cells. When water has been placed on the meat which is in a kettle, place it on a stove where the fire is not too hot, so that boiling will not take place too rapidly. Allow to cook gradually for about four or five hours or

longer. The water which was taken in by osmosis will fill up the cells to their fullest capacity, and when boiling occurs the liquid inside the cell-walls will expand enough to burst the cell-walls. Then all the liquid in the cell-walls, the liquid that was in the meat, besides the water which was absorbed, will be released. Upon boiling gradually a few hours the water will be evaporated, and you will have left a rich broth. If the water disappears from the meat before the meat is quite soft and well done, add more water, as many times as necessary. This can be boiled off again by heating properly. The meat which is left will contain less nourishment than it would if boiled in a different way, but in this way the soup is most nourishing. *Add enough salt to suit taste* about half-hour before done.

(*d*) 1. Structure of meat-cells: color, shape, texture.
2. Characteristic of soup: fat globules and taste of soup when hot and cold.
3. Boiling of meat, as I have observed for soup or for meat.
4. Frying of meat: that a hot fire is necessary to make a good job of it.
5. How soup is prepared from soup bone and tough meats.
6. How meat looks if soup has been made from it.
7. How soup looks after it is finished, and how soup should be eaten, hot or cold.
8. Nourishment contained in various soups.
9. How meat left from cooking soups would taste.
10. Why sick people are fed soup instead of meat: because it is more easily digested—also more quickly. —(R. B.)

VI. (*a*) The reason that dried prunes swell when placed in water is that osmosis occurs in the cells. The cell-sap, which is a much denser liquid than the water, acts through the cell-wall (as a membrane), and osmose reactions occur. The greater flow, of course, is to the denser cell-sap from the water.

(*b*) I derived this answer from my past experiments on osmosis. I thought first of the grape-sugar experiment,

then of the one where potato is the main material (osmosis in living cells). I thus derived the answer from the fact that osmose reactions occur through cell-walls.

(*c*) I think that a richer (if not more in quantity) soup or broth could be made if the meat-cells were broken down completely. In case it was to be boiled first, I should think that osmosis would occur between the dense cell-sap of the meat-cells and the less dense water. But osmosis takes time and all of the cell-sap would not come out, and neither would all the water go in; in fact, only a precious little would go into the cells. So I conclude that if the cell-walls were broken down a richer soup may be expected.

(*d*) To derive this I thought of the osmosis experiment that we had performed and remembered that they stood twenty-four hours and changed only a little. So to cook meat so that all the rich cell-sap and protoplasm, etc., would enter into the broth the cell-walls must be broken down. I also thought of how soft and mushy the potato is when boiled. That is a case of cell demolition.

VII. (*a*) Because osmosis takes place. The material inside these fruits is more dense than the water. Osmosis is the interchange of two liquids of different density through a plant or animal membrane. The membrane in this case is plant, and it is composed of the cell-walls and the fruit-wall. The raisins and prunes are not entirely dry. There is enough moisture in these cells to insure the reaction. If these fruits were perfectly dry no reaction could take place. The "bloom" is taken off these dried fruits.

(*b*) *Analysis of Thinking.*

a) Points about composition of fruits.
b) Study of cells and functions.
c) Principles of osmosis.
d) Actually seeing these fruits "fill out."
e) Seeing no reason for doubting the principle of osmosis applied in this case.
f) Conclusions.

(*c*) We know meats contain juices. These juices contain minerals, proteins, and carbohydrates in the cells of which it is composed. Of course to obtain broth containing these foods they must be extracted from the meat. To do this the meat must be cut up in small pieces to obtain more surface and boiled in water containing salt. The salt solution will be more dense than the cell-sap and the osmosis will take place and boiling will burst the cell-walls. The results will be that the juices will be extracted. The boiling also makes it possible for the fats to assume a more digestible form. This method enables one to obtain all the benefits of the meat in a more readily digestible form.

(*d*) *Method of Thinking.*

1. First, I recalled my knowledge of the composition of meats, and related it to the principles of osmosis. Then I connected up some of my knowledge in physics of pressure. I then remembered some of my chemistry about the insolubility of fats. These I linked together with osmosis and my study of foods in biology, and reached my conclusion of the preparing of foods.—(C. S.)

C. Individual Help on Recognition of Complete Subject and Predicate in a 7th-Grade Class.

Ten sentences were worked out in this class. Each pupil marked complete subject and predicate on his own paper, working individually, and came to the teacher, or to the class helpers, when assistance was needed. The numbers refer to the sentences with which the pupils had difficulty. In most cases the pupils made no answer, but simply went back to their seats and corrected their mistakes. Before the end of the hour all had marked all the sentences without error, and had their papers O. K.'d by the teacher.

(Thus far we have been recognizing the simple subject and verb. The *complete subject* usually contains words or groups of words which describe it more fully. So the verb also has its modifiers. In the sentence "The cosey room was littered with books and papers," the simple verb is *was littered.* "With books and papers" adds to the picture, tells

us more about it. The verb with its modifiers—as *was littered with books and papers*, in this sentence is called the *predicate* or *complete predicate*.)

Underline with one line the complete subject, with two lines the complete predicate, in the following:

1. After the theatre we drove home.
2. Down he went on all fours.
3. Quick as a flash the blow fell.
4. "Aye, aye," answered the sailor.
5. A worse trip they had never taken.
6. Lost in the wilderness the children wandered for hours.
7. Not every one could make as good a speech as that.
8. Here comes the teacher!
9. The principal had called Lucy's mother to a conference.
10. We had had a delightful picnic after all.

The following responses indicate the character of the procedure employed in directing these pupils at work:

Helen.

3. (Pupil's question.) Would you put *the* with *blow*? (He continues.) Oh, yes, it tells *which blow*.
10. (Pupil's question.) *Had had*. What is that supposed to be?
6. What does "lost in the wilderness" modify? (I had to ask this question at least a dozen times.)
7. Does "*not*" modify *could make* or *every one*? (I think myself that this could perhaps be construed in two ways.)
1. What does "*after the theatre*" modify?
9. "Lucy's mother" tells *whom* he called. (This pupil had the subject right.) We call that the ——? Do you know whether it belongs to the subject or the verb?
9. Is "Lucy's mother" the subject? Does it belong to the subject?
7. "As good a speech" tells ——? You call that ——?
5. "A worse trip" tells ——? Cover it up and see what you need to know in the sentence; then uncover it and see whether that tells you what to do.
3. Does "quick as a flash" tell about the blow? What does it tell?
9. This is wrong. I think you can tell what is wrong with it.

Following is a report of one of four pupils who got their papers O. K.'d early in the hour, and who were permitted to help other pupils *by asking questions*, never by telling. These pupils noted down the questions they asked, and, in some cases, the answers:

3. Why would "quick as a flash" modify blow? Then what would it modify?
2. What did he do?
3. Why would "quick as a flash" be the subject? What did it do? What does "quick as a flash" modify?
5. What did "a worse trip" do?
6. What did the children do? What does "lost in the wilderness" modify?
7. What is the subject? Why would "as good a speech" be the subject? What did every one do?

D. Habits of Work of Individual Pupils.—Two examples of the methods of work employed by pupils are included here. The accounts are given by the pupils themselves. The request made of them was to have them study the problem or exercise and then to tell what they actually did in trying to learn the thing in hand. (These accounts are not changed materially from the form in which they were submitted by the pupils.)

(a) Exercise. "Ex quibus L. Petrosidius aquilifer, cum magna multitudine hostium premeretur, aquilam intra vallum proiecit; ipse pro castris fortissime pugnans occiditur."

1. "Ex" is a preposition and it means *from*. It takes the ablative case. "Quibus" is either in the dative or ablative, but since it follows "ex," I guess that it is object of the preposition. I think that this means either *from which* or *from whom*. "Lucius Petrosidius" is a proper name, I know. "Aquilifer" probably comes from *aquila* and *fero*, meaning *to carry the eagle*. Then I know that each legion has an eagle, so I know that the word means an *eagle-bearer*. It is in the nominative, the same as Lucius Petrosidius, so I know that it must tell who Petrosidius is. Because they are both in the same case, I know that they are the subject. I know that the sentence runs so far like this: "From which Lucius Petrosidius, an eagle-bearer." The next word is "cum." I know this is a preposition that takes the ablative case and means *with*, or it can be used with the subjunctive to mean *when*, *although*, or *since*.

"Magna multitudine" is in the ablative, so I think the phrase means *with a great multitude*. "Hostium" is the genitive case, so it must mean *of the enemy*. The verb at the end of this sentence is in the subjunctive, so I see that I was wrong in thinking that "cum" went with "magna multitudine," and I see that "magna multitudine" is ablative of means and "cum" means either *since* or *although*. Then the sentence so far would read like this: "From which Lucius Petrosidius, an eagle-bearer, since (or although) by a great multitude of the enemy he was hard pressed." "Aquilam" is in the accusative, so I know that it must be the object either of a verb or of some preposition. "Intra" is a preposition meaning *behind* that takes the accusative, and as "vallum" is in the accusative, it must be the object of "intra." "Proiecit" is a verb meaning to *throw*, and as it is in the third person singular, it must mean that "Lucius Petrosidius threw." It is past tense. "Aquilam" must be its object, so the sentence must be translated like this: "The eagle behind the wall he threw." "Ipse" is in the nominative case, so it must mean *himself*, referring to Lucius. "Pro" is a preposition that takes the ablative and means *for*. "Castris" is the next word, in the ablative, so it must mean *for the camp*. "Fortissime" is superlative adverbial form of *brave*, so something must be done *most bravely*. "Pugnans" is a participle, I know by the *ns* ending. In English it is a verb form ending in *-ing*, so this is translated as *fighting*. It is the same form as "ipse," so it must modify it. "Occiditur" is the present passive, third person singular, so it must mean *he is killed*. The last phrase then must be translated like this: "Himself for the camp most bravely fighting, is killed." Then I go back and get all the parts and get a sentence like this: "From which Lucius Petrosidius, an eagle-bearer, although by a great multitude he was hard pressed, the eagle behind the wall he threw, himself for the camp most bravely fighting is killed." Then revising it, I get: "From which Lucius Petrosidius, an eagle-bearer, although hard pressed by a great multitude, threw the eagle behind the wall. He was killed most bravely fighting for the camp."—(Dick, fifteen years old.)

(*b*) *Experiment in Chemistry.*

My problem was to make five grams of $Al(OH)_3$. I looked up $Al(OH)_3$ in the solubility table, and found that it was insoluble. From this I knew that it could be prepared by precipitation. The next thing that I had to do was to find two common soluble salts; one which contained the needed Al ions and one that had the OH ions. I chose $Al_2(SO_4)_3$ and NaOH. I also found that $Al_2(SO_4)_3$ contained eighteen parts H_2O, and that NaOH contained none. I then wrote the equation representing the reaction that would take place. The equation was as follows: $Al_2(SO_4)_3 \cdot 18H_2O + 6NaOH \rightarrow 3Na_2SO_4 + 2Al(OH)_3 + 18H_2O$. I

found the molecular weights on each side balanced each other, and so I knew that the equation was correct. The weights on each side of the equation were 906. I next wrote and solved the proportions giving the amounts of material needed and the amount of products formed. To do this I used the following proportion: the molecular weight of the known weight is to the molecular weight of the unknown weight as the known weight is to *x*. (*A page of equations and proportions follows.*)

As a result of these proportions I found that I would have to combine 21.34 grams of $Al_2(SO_4)_3$ with 7.69 grams NaOH to form 5 grams $Al(OH)_3$, 13.65 grams Na_2SO_4 and 10.38 grams of H_2O. The weights on both sides of the equation balanced, and so I knew that my figures were correct.

After I had completed my calculations I weighed out my compounds as accurately as possible, and dissolved each of them in separate beakers of distilled H_2O. I used distilled H_2O because I knew that the tap water contained impurities. I then poured the NaOH into the $Al_2(SO_4)_3$. I did this because this is one of the few cases where it makes a difference how you mix two solutions. $Al(OH)_3$ is soluble in NaOH, and if I had added the $Al_2(SO_4)_3$ to the NaOH, the first $Al(OH)_3$ formed would have dissolved in the excess NaOH and the weights would have come out wrong. I then stirred the mixture of white precipitate and colorless liquid so as to be sure all the precipitate was formed. When I had stirred it several minutes, I got a filter-paper and weighed it and filtered the mixture. After I had gotten all of the filtrate out of the beaker and onto the filter-paper, I washed it several times with distilled water. I did this because I knew that some of the Na_2SO_4 that was formed would adhere to the $Al(OH)_3$, and when it dried would make the weight come out wrong. I let the precipitate drain one whole night, and then the next morning I wrapped it up and put it in a sand-bath to dry on the radiator. To illustrate the amount of water in the precipitate I weighed it before and after drying, and the weights were (with filter-paper) 63 and 7.85 grams respectively.

There are a great many chemical principles illustrated by the reaction involved in this experiment. The first of these was double replacement. Double replacement is when two compounds react to form two new compounds. This was illustrated by the equation representing the reaction that took place; $Al_2(SO_4)_3 \cdot 18H_2O + 6NaOH = 3Na_2SO_4 + 2Al(OH)_3 + 18H_2O$. The *Al* in the $Al_2(SO_4)_3$ changed places with the *Na* in the NaOH, forming Na_2SO_4 and $Al(OH)_3$. The reaction also set free eighteen parts water of crystallization.

The law of conservation of mass is illustrated by the fact that the weights of materials put together (left side of equation) balanced the weights of products formed (right side of equation). 21.34 grams $Al_2(SO_4)_3 \cdot 18H_2O$ reacted with 7.69 grams NaOH to form 13.65 grams

Na_2SO_4, 5 grams $Al(OH)_3$ and 10.38 grams H_2O. The weights on each side of the equation totalled 29.03 grams.

Molecular weight means the number of times the molecule of any substance is as heavy as the H atom. For instance, the molecular weight of $Al_2(SO_4)_3 \cdot 18H_2O$ is 666. (The molecular weight is obtained by adding the atomic weights.) The 666 means that the single molecule of $Al_2(SO_4)_3 \cdot 18H_2O$ is 666 times as heavy as a single atom of H.

Atomic weight means the number of times the atom of any element is as heavy as the H atom. In the equation the atomic weight of Al was 27. That meant that the atom of Al was twenty-seven times as heavy as the H atom, taking the H atom as one.

Valence is very well illustrated in this reaction. Valence means the number of univalent ions necessary to combine with or replace one atom or ion of any other substance. This was illustrated by the fact that in the formula $Al_2(SO_4)_3$ the valence of Al was three and the valence of SO_4 was two. Therefore, we took two Al's and three SO_4's, thus balancing them by giving each a valence of six.

The law of definite proportions is that every compound has a definite composition by weight. This was illustrated by the fact that the same amount of $Al_2(SO_4)_3$ always reacts with the same amount of NaOH to form the same amounts of H_2O, $Al(OH)_3$, and Na_2SO_4 in each case.

The ionization theory is illustrated by the fact that the compounds break up and form new compounds. From this it is only reasonable to assume that the compound broke up into the ions formed in the new combinations.

These are the most important of the principles involved in this experiment. I learned from the experiment that to do a thing correctly you must be accurate, think before you do things, and observe carefully. —(Douglas, fifteen and a half years old.)

(Needless to say Dick and Douglas have learned to study. They appear not to be innocent of thinking.)

Incidentally these two boys, Dick and Douglas, have presented their work in good (not correct) English. The practice of writing "themes" in the English classes with a high degree of frequency, quite regardless of any vital or created interest in the topics assigned, may prove to be far less productive than the practice of utilizing materials in other courses which the pupil is pursuing. These boys were not made explicitly aware that they were writing "themes." Good

work, clear thinking, in any department must be expressed in good English. The department of English should establish organic relations with every other department in the school and draw into the procedure such material as is illustrated in these examples. The use of mathematics in the latter is equally suggestive of a vital co-operation in another direction.

CHAPTER IV

ORGANIZING PRINCIPLES AND DIFFERENTIALS

Principles of Procedure.—Two guides to procedure are suggested:

1. *We need to consider definite organizing principles, clear-cut unifying core-ideas, co-ordinating challenges, in order that a common basis may be established for productive forms of discussion and for economical ways of carrying on the work of a group of individuals.*

2. *Within the common medium, a described circle, an organizing principle, or some co-ordinating ideal we should be constantly alert to individual differences, and should make deliberate provision for differentials, with several transmissions ahead, in order that no individual in the group shall be tempted to retire from the game, or be tempted to fall into passive attention, or induced to become a mere observer or spectator.*

These two guides are best conceived as interlocking suggestions in a procedure in which the social principle (Chapter VI) is constantly employed as a clutch to throw the belts on the individual generators, and also to unify and to co-ordinate our ideals.

Challenge is used to designate the new *indeterminate* assignment. It takes the place of the conventional daily assignment of "lessons." The challenge may be a day's work, a part of a day's work, or several days' work. It will be observed that the principle of a common medium upon which collective teaching rests is

provided. For the uniform lesson and minimum essentials of content *organizing principles* are substituted. It will be observed further that the claims of individuality are met by making continuous and deliberate provision for differentials *within* the challenge or organizing principle. Some canyon is selected for the prospecting party. The members of the group do not disperse into scattering units in a loose organization to wander afield in any direction at the caprice of inexperienced guides. But when the canyon is selected, the members of the group are not required to march in lock-step organization. They may not always be in sight of each other. They are at all times within the potential control of the director.

Procedure Illustrating the Operation of Principles for Unity and Differentials for Variety.—Let us study, now, a number of illustrations to get the feel and drift from passivity in the recitation mode to the spirit of work, the zest of attention, the joy of achievement in a productive form of directed teaching.

A class in algebra has been called to order. Twenty-eight vigorous, "free," conversing, joyous boys and girls have come to attention. The recitation begins. The lesson assigned the previous day was ten exercises in factoring. Twenty pupils are sent to the board with directions to number alternately one, two. All "ones" write the solutions of the exercises numbered *odd;* "twos," the exercises numbered *even*. The pupils at their seats take their morning siesta for the time being. In a few moments pupils are seated and explanations are read from the board. In ten minutes the lesson is "said," and the repetition and further delineation of the obvious are about to begin.

At this juncture, with thirty-five minutes of the class period left, it was suggested by a professional associate that every pupil *get on his mark,* and work forward as rapidly as possible. At once the belts were beginning to be slipped on the generators; the game was on. The teacher became a director of activity, a consulting expert, a guide; each pupil in a challenge with a unifying principle (factoring was the organizing principle now) was leaping forward at his own best rate.

The pupil or pupils who encountered particular difficulty in parts of the challenge grouped around the teacher in the corner of the room or at the board, and found a way of making the hurdle; all were alive and moving freely, coming to the visiting associate and the teacher to check results; one pupil forging ahead, almost at the end of the challenge, was called (promoted) to assist in checking the work in this beehive of industry; at one point the attention of the whole group was arrested by the teacher, who, by moving in this new intellectual game, discovered the need of referring to a crucial point in the *organizing principle;* two minutes of clear elucidation and every pupil was contributing to the making of the dust of industry. Here in one part of the room were four pupils in a group working under the management of James, who was expounding some principle with apt illustration.

At the end of this part of the class period, converted into a real *directing-study movement,* these pupils in thirty-five minutes had solved in a forward-moving challenge from six to fifty exercises: three pupils solved less than ten exercises, four solved more than forty, and the other members of the class ranged along from

ten to forty. This work was adequately checked in the class period. It was necessary to introduce a new set of exercises in the general challenge to have the *emerging* upper third of this class employed.

The new procedure in this illustrative exercise was based upon two conceptions: (1) an organizing principle to think with—to carry the load, as it were, and (2) *within* this principle "doable" parts of the challenge. Factoring was that organizing principle; the exercises arrayed provided material for differentials. *All* members of the class employ (think) the organizing principle; *each* pupil works up to his capacity within the challenge.

It is not essential that every pupil shall solve all the possible parts of a challenge in order that an understanding of the *organizing principle* shall be gripped. In fact, both the organizing principle and the materials of instruction are indeterminate (not indefinite). The upper limit of exercises to be factored has not been reached nor has the *principle* of factoring been exhausted. Even the pupil solving six exercises was incorporating the principle, thinking it, living it, although not as fully perhaps as the pupil at the upper end in this particular part of the challenge. In other words, it is exceedingly difficult to make any statement of a pupil's comprehension of a fundamental principle. Quantitative measurement of results throws some light on the problem.

Is it not perfectly clear that an assignment of ten exercises for an outside preparation by all alike is not only stupid but actually immoral pedagogy? To hitch together twenty-eight pupils in *collective teaching* in any attempt to march in lock-step introduces a whole

progeny of pernicious errors. The demonstration of a new procedure, just illustrated, points clearly to the conclusion that it would be a dishonesty for a considerable majority of this class to be led to accept an irreducible common minimum of ten exercises as a real lesson, only to come together to hear the lesson "said." The set-lesson is hardly fair for one falling conspicuously below it after making an honest effort to master it.

Let it be remembered that pupils *at work* do not turn off equal amounts; they do not read with equal understanding, even though their reading rates may be approximately the same. The *indeterminate* factors are there constantly making for differentiation. The way out is not to bring together in class sections pupils of equal ability. No two individuals are equal in capacity. In every class the pupil should be regarded as the educative unit. If so, then differences, such as appeared in the class *at work* in mathematics, just described, will arise. It is only in a mythical world that the *average* pupil finds a habitat.

In the last illustration the reader will note the fact that the assignment (challenge) was begun in class after the first ten minutes; for thirty-five minutes the challenge was pursued by every member of the class with almost a maximum, not a uniform, efficiency. At all events, no one was idle, passive, or indifferent. They all took to it as ducks to water, and it is an indication of a sound educational philosophy if the pupils take to work and feel a bit put out if they are asked to set it aside and listen to an explanation.

Some of these pupils in this demonstration, those in the lower third in that day's work—not in the lowest

third by the grace of God and an act of parliament—needed to be urged to continue the challenge outside of class. They did it. Others in the class who had exceeded the old speed-limit by doing two or three days' work in thirty-five minutes—work that would have made two or three lessons in the lesson-hearing school—they, too, continued their challenge, but in a different way. We shall grip this aspect of our problem later in shaping up the home-study situation.

The Topic Method, an Emphasis on Variety.—The claims of individuality have been asserted over and over again. The topic method is an expression of the need of variety. No doubt much profitable work has been accomplished by stimulating pupils to work out individual projects. In fact, in the upper years of the high school excellent results may be attained by having pupils work up comprehensive problems, taking the form of an exhaustive study of topics (projects) in history, English, science, etc. In handling these problems in the class period an opportunity is afforded for some very productive forms of discussion and participation. It requires, however, a high order of leadership to avoid a perfunctory reading of written reports, and a nauseous inactivity of the members of the class *merely paying attention*. Unrelated topics or problems do not provide a basis for the recognition of our first guide, viz., *an organizing principle*. The second guide, *differentials*, is apparently met.

The difficulty lies in the fact that there are no integrating, cohesive bonds which knit together the interests of the group. There is likely to be separation with only an artificial and external unity. The teacher who employs the topic procedure productively will be

required to work faithfully into the topics himself in order that he may enter into a vital discussion of them with the class and the pupil.

It is possible to work out the co-operative challenge or "project," in which many aspects of the common principle are offered as contributory problems. There may be as many distinct problems raised within the co-operative challenge as there are members of the class; or pupils may work at a few major problems or topics in group partnerships.

All subjects of the curriculum offer abundant opportunities for this type of analysis and procedure. The topics or problems are related to each other, and are bound up in a common *organizing principle*. The individual report is a part of an organized unity. By careful selection of related and contributory topics within a *realization* or *principle*, discussion may be made vital for every member of the class.

The practice of desultory reading of unrelated themes, essays, topics, reports, etc., with both teacher and class, save one at a time, reduced to observers, may be obviated by employing these two major guides.

The Co-operative Project and Differentiation.—The suggestion of a co-operative challenge, in which provision is made for differentiation either for individuals or for groups of individuals is not new at all. It has been employed effectively in reviewing a subject. The possibilities of pursuing new work by this procedure are not as fully recognized. It would seem to be a fruitful departure to approach the study of a new challenge in this manner in those courses in which there is a wealth of material and many aspects of the challenge to be surveyed.

For example, a history class (12th grade) was about to pursue the Monroe Doctrine. The procedure hit upon illustrates the point in question. *A* and *B* were selected to report on the European situation at the time the "doctrine" was promulgated. *M* and *N* made a study of the work of John Hay in China. *O* and *R* worked on the Venezuelan problem. *E* and *F* took Article X of the League of Nations, etc., etc. Each group was made responsible for the particular task assigned to it. Study was not limited to a single phase of the problem. As soon as any group mastered its own specific part of the challenge, another phase of it was taken up. Some pupils studied all aspects of the problem.

Each pupil was interested in every one of the reports, and was able to enter into a vital participation as an intelligent *reacting agent.* Every individual interest in the study was looped up within the common *organizing principle.* After this study and discussion of the Monroe Doctrine, it is needless to say the "doctrine" was not fully comprehended; the assignment was indeterminate, yet very definite, in that the material was not exhausted. The discussion of it was not finished. The "principle," itself, had not reached its final form. The Monroe Doctrine was not finished. This illustration is intended to suggest a line of departure; it is by no means exhaustive or final.

Endless Differentiation.—The reader may have already become weary of illustrations of the procedure contemplated in this study. The only justification offered for multiplying examples is the fact that no single method or type can be laid down as a final rule of practice.

Life is fenced round with prohibitions which the young explorer must not be allowed to ignore. But within the circle thus marked out there is infinite room for his activity. Even when the moral law is positive and not merely permissive, obedience may take forms endless and incalculable; thus a motorist, it has been said, best shows his love for his neighbor by keeping to the right of the road. It is manifest that there is no limit to the number of life-patterns into which good or blameless actions may be woven, and that it is impossible to formulate in advance the concrete principle of excellence of any of them.*

All of these illustrations of class periods conducted upon the application of the *social principle* are intended to present situations in which attitudes of teachers and pupils may be cultivated in the direction of responsible self-activity and fruitful participation.

Responsibilities of New Teacher as Director of Activity.—Work shyness is a very common malady in the lesson-hearing school. It is due, in very large measure, to a lesion of the social sense. Pupils are brought together and yet kept apart in the recitation system. No matter to what extent uniformity is insisted upon, the fact of individual differences is constantly manifested. Codes, adopted with enthusiasm, are found to be in constant need of reinterpretation. The aim in the following examples is to stimulate our thinking along some lines of possible release of potentialities of both pupils and teachers.

There is no algebraic formula to be laid down in a cold, administrative manner. By entering upon the adventure with a determination to take the moral hazard at the fork of the road, teaching becomes a process in which developing powers are progressively realized.

* Nunn, T. Percy, *Education, Its Data and First Principles*, p. 6.

Imagination is needed. "For our sentiments and passions furnish in great part the premises with which intelligence works; they are the pigments, so to speak, with which we paint the picture. And so with the collective aspect; discussion is far more than an interchange of ideas; it is also an interaction of feelings which are sometimes conveyed by words and sometimes by gestures, tones, glances of eye, and by all sorts of deeds. The whole psychic current works itself up by complex interaction and synthesis. Intelligence, in the fullest sense, is wisdom, and draws upon every resource of the mind." *

Codes may be carried out in a rigid, relentless, impersonal, quantitative manner. The new teacher, however, finds in the *social principle* a dynamic in a moving stream, and works into new situations with increasing inventiveness and adaptability. The qualities of the referee and the glorified umpire are highly desirable. This new director of activity develops a fine sense of tolerance in becoming adept in seeing many modes of excellence, and in utilizing a variety of encouragers to good work. By elevating teaching to the higher reaches of leadership and guidance the teacher is no longer a "keeper" of school and a "hearer" of lessons; scholarship is recreated in the larger perspective of the challenge or problem level of teaching.

The new teacher does not prepare himself to meet his class by mastery of a "lesson" and a formalized technic by which to conduct the "lesson." All that is secondary, perhaps essential at times.† The gripping

* Cooley, C. H., *Social Process*, p. 357.

† The following diary written by a college senior in the Wisconsin high school of the University of Wisconsin illustrates the procedure as it applies to prospective teachers in their preparation through *participation* (not practice teaching):

"In my preparation for to-day I found that I could translate the sentences on the page assigned, give constructions, etc., with no difficulty.

of *organizing principles* in handling the materials of instruction and preparation for stimulating and guiding mental life are essential for every teacher. There is always the new boy and there is always the fact that the boy moves.

The reader may be interested in further examples which serve to emphasize the teacher as director of action, consulting expert, referee, umpire, encourager, stimulating guide. No matter what particular form of action, or method in the deeper sense, is focussed upon, the ideal of directing study in this interpretation is protected and illustrated just so long as all members of the class are at work; just so long as the human generators are belted up for productive work; just so long as no one is compelled merely to pay attention or to appear to do so.

Purpose of Illustrative Exercises.—The distinctive characteristic of directing study is the variety of pro-

What I did was substantially as follows: I detected a possible reference to the gerundive construction. I was not sure that I would need to explain it, inasmuch as I had not a predetermined plan to follow in detail. So I went over that pretty thoroughly so that in the event I should be called upon or in case I had an opportunity to make use of the gerundive I could acquit myself with credit. I thought of some possible stories, suggested by certain material in the sentence exercises. So I reinforced my supply of stories and allusions. Then there was, it seemed to me, a good chance to work on derivative blanks, in case we got along well in the class period. So I arranged some extra background upon which to focus this particular work for the day. Needless to say, I did not expect to use all these points I have mentioned. Nor did I go into detail with minute plans as to how I would proceed if called upon to respond in any one of the many ways this opportunity presents. I am fully aware now that I must have at my command a hundred times more than I can hope to use in a particular class period. One must be fortified in many ways to cope with pupils in a classroom where all work forward and where no upper limit is set for any one."

cedure. No single model can be described with any assurance that the essential movement in it can be imitated. The illustrations of procedures are not intended to serve as copies to be duplicated, but rather as hints to establish in our thinking about teaching lines of departure and certain attitudes toward boys and girls *at work*. It is not to be concluded that *the* one and *only* sure way to success has been disclosed, nor that the study or challenge has been exhausted. What we are interested in doing is to suggest possibilities for the release of energy and the development of initiative.

Once the journey is begun in the direction of prospecting on one's own account, new and unsuspected powers are cultivated and *realized* (actually created) in the adventure. In other words, that quality of originality, so highly prized in good teaching, grows by exercise in the direction of successful experimentation; it is not a quality possessed as a gift. One's originative and inventive powers are developed through exercise in situations requiring purposeful adaptation. "Model lessons" followed with a literal and slavish devotion are deadening.

The aim in these illustrations is frankly to stimulate interest in similar adventures. "Trial and success" may be safely relied upon wherever there is a keen sense of responsibility. Teachers should be encouraged in applying the experimental method. If there is being developed increasing capacity for self-direction and self-criticism, a foundation is laid for the achievement of desirable objectives in the new procedure.

A Bit of 9th-Grade English.—A class in English had worked two days on Shakespeare's "Julius Cæsar."

During the second day's work it was suggested that the teacher or some pupil might turn to any part of the play and begin to read. All the pupils had their books at hand. As soon as any pupil, or teacher if a pupil read, found the place he would stand up. When three or four had found the place they were given recognition by having the results recorded on the board. The names of pupils and teacher were posted on the board. Opposite the name of the pupil who was first to rise, 4 was placed, 3 opposite the name of the pupil who was second, and 2 and 1 opposite the third and fourth respectively. In the course of the hour—it proved to be an interesting intellectual game—every pupil in the class had won some recognition. The reader had skipped about, reading altogether parts of twenty passages. In some instances the reading was continued for several lines before the pupils made the connections. The total score was easily found and all members of the class could *see* their ratings.

The surprising thing about this procedure was the fact that one boy in the class made a respectable showing despite the fact that in previous assignments of memorizing work he had failed utterly. Without belaboring the point is it not evident that something of the spirit of the game caught the imagination of these 9th-grade boys and girls? A functional outlook upon memorizing might be mentioned in passing.

Following this particular day's work this suggestion was made: "Suppose we come prepared in a day or two to give from memory as many lines of 'Julius Cæsar' as we can, *each in his own tongue*." Pupils selected, *as they willed*, such passages as appealed to them. In-

stead of the literary canon, the *cafeteria* plan was employed, *i. e.*, there was freedom of selection within the circle described. This is liberty armed with the law. The teacher refused to select the food for the pupils.

The conventional comment at this juncture is that pupils will not rise to that sort of a challenge; that they will certainly take a moral holiday and return next day with all sorts of excuses for not doing the assignment. In this particular instance, however, the next session of the class revealed a different story. Thirty-two pupils in this class, and three college seniors preparing to teach, made the following score: the pupil having the least number of lines offered 15; the pupil having the highest number of lines gave 156; and the pupil who felt the sting of defeat was second with 148 lines. This fact of human reaction is known by all those who appreciate true sportsmanship in the great adventure of love and the joyously serious business of athletics. The median was between 50 and 60 lines.

No pupil failed in this challenge; the college seniors were not far from the median; the teacher himself frankly said that he could not render as many lines as the upper third in the class that day. Again, the scores were written on the board opposite the names of the pupils. Printed lists of the names of pupils will serve to economize time and energy in giving attention to publicity of results.

It is perfectly obvious in this illustration that all pupils could not be called on to give *their lines* before the whole class. Only three or four pupils were selected for this privilege, among them the boy who had prepared fifteen lines. A system of partnerships

was worked out. One pupil gave *his* lines to another; small groups were formed in which some one was selected to give his lines to the larger audience.

Even the most satisfactory type of "lesson" under the old procedure, in which the practice is that of assigning a *set* lesson of thirty lines to be committed to memory by all alike, could not conceivably be regarded as productive as the work just described. Let it be granted that all would learn accurately the thirty lines in the conventional practice; no provision is made in that school for the release of potentialities. There is no stimulus there for the pupils who can and would do five times thirty lines.

In this class in English it was suggested that the members of the group decide who, *all things considered*, did the best. The astonishing thing happened: William with his fifteen lines received a significant vote. No one believed William would be able to stand up in front of his peers and speak his lines, "Friends, Romans, Countrymen," etc.; but he did. William had advanced his stock by giving the class within a fortnight a description of the Baldwin locomotive compound. William knew more about it perhaps than all the class put together, including the teacher. He expressed himself, to their amazement, in good, lucid English, whereas his habit had been to express himself rather badly. His English fared better when tied up in a locomotive than it did in the categories of his teacher of English. William's particular mode of excellence was appreciated; a recognition of *alternate leaderships* was beginning to be manifested. There was something wholesome in this expression of his work, even though he did not deserve such generous recognition in presenting Shakespeare.

Publicity of results may be employed in many stimulating directions. Even the quantitative presentation of results may be subjected to a refinement of analysis beyond the stage of cold figures. For the pupil in this class who produced a hundred lines or more to have reported with less than twenty lines would have been occasion for the frown of his fellow critics.

Developing Interest in the Traditional Material of the Curriculum.—The reader will be impressed, no doubt, with the fact that no elaborate plea is made for going afield in search of *interesting* material. The stir of life may be detected in the curriculum morgue in the approach and emphasis presented in this thesis. Even decimal points, dubbed by Randolph Churchill when chancellor of the Exchequer, as "those —— dots," words, exercises, the conjugation of *amo*—all sorts of materials of instruction may be caught up in the challenge in the spirit of the game and, with a competition that both sweetens life and stirs to action, mastered with a remarkable economy and interest.

Norman MacMunn* tells us that before a "commissioner for oaths" he would solemnly declare that his boys at twelve to fifteen years of age would not leave their French verbs for picture-books.†

A class of 8th-grade "Junior High School" pupils worked up a word contest in Latin. Five hundred words were selected by pupils and teacher for the try-out. When the contest came at the end of two weeks the lowest score was above 300; there were six scores running from 490 to 500.

The real problem is not centred in any irreducible minimum of content, but clearly in procedure values.

* MacMunn, Norman. *Educational Times*, 1914, 467 *ff.*

† *Ibid.* *A Path to Freedom in the School*, Part II, chaps. I, II.

We of the pioneer days on the frontier may overdraw the picture of the old spelling school in which we scaled the polysyllabic Alpine peaks, sure to slip in crossing the crevasse between the *i* and *e* in those treacherous *ie* and *ei* words. Suffice it to say that there was no fun in spelling the easy or the most-used words. This remark will be understood as a plea in behalf of a new movement to-day in American Education—a plea for a real challenge, a big realization; one that looks big, too, in the eyes of the boys and girls at a time when there is a craving for a longer tether. A spelling sense and a critical attitude toward words may sound a bit old-fashioned, yet one may not pass for a hopeless lunatic in asserting that many earnest strivings after efficiency, systems, and methods may, after all, miss the key to a very simple problem.

An Experiment in Teaching the Bible.—We venture to give a brief account of an experiment in Teaching the Bible,* to illustrate a bit of consecutive procedure. For three years this experiment was conducted in the 9th grade of the Wisconsin high school of the University of Wisconsin. The time devoted to it was four weeks each year, five hours a week. The work was a part of the English course. The main purpose in referring to this experiment is to suggest possibilities in handling subject-matter and in initiating procedures in the regular subjects of the school; practically every subject lends itself to some phases of the procedure carried out in this experiment. The *indeterminate* assignment is admirably presented. There are splendid

* For a full account of this experiment, see *The English Journal*, vol. VII, no. 10, December, 1918: "Teaching the Bible in the Junior High School," by Charles S. Pendleton.

challenges in which unifying principles and provisions for differentials are clearly set forth. Mutual teaching, co-operative learning, a *modus vivendi* founded upon vision and promising emancipations, a vigorous working group, are illustrated.

(*a*) In a preliminary discussion the teacher brought out very clearly what the Bible is about as a whole, carefully explained the meaning of the terms Religion, Theology, and Bible Stories, showing that the last are neither Religion nor Theology, and that nearly all literature refers to them, and finally made it perfectly clear to the pupils that all forms of belief will be respected. One day was spent in preparation for the journey.

(*b*) The next day 280 Tissot Bible pictures full of remarkable detail in Oriental color were found on the walls of the classroom. Each picture bears a serial number and a Bible reference. Each pupil took a sheet of paper and spent the hour looking at the pictures, writing the numbers of those the stories of which he could not give. This was individual work. The teacher was the captain or leader of the group. The pupil was asked to rehearse to himself the story connected with every picture he was sure of. Usually this work continued two days.

(*c*) Then each pupil was requested to bring from home his own Bible. A shelf was cleared for the storage of these Bibles. Each pupil was then set to work to look up in his Bible the stories of all pictures which were listed on his pad as unknown. All kinds of Bibles and substitutes for Bibles were found in this collection. The school furnished three or four copies of Professor Moulton's book—*The Modern Reader's Bible.* In this part of the experiment the teacher was a consulting expert and a responsible executive. An excellent pupil was called to assist those who were in difficulty. Usually three days were given to this phase of the work. It is interesting to note that the pupils from Jewish homes knew all the Old Testament stories. No difficulty was met in having them study the New Testament stories when it was tactfully pointed out that subsequent work in English would require familiarity with them, if the excellent pupil was to succeed in the game. One pupil, realizing that she

knew too little about the Bible, became interested in Professor Moulton's book and read it quite through.

(*d*) The next step was a written test on the pictures, given not to secure a grade for record, but to encourage the excellent pupils and to stimulate the backward; and also to unify the work of the class. The class was divided into several groups. Numbers referring to pictures were written on the board for each group. Pupils spent the hour alternating between bulletin-board and desk. They wrote the story of each picture in the test, each pupil relying strictly on his own resources. The teacher graded the papers roughly, picking out excellent pupils for praise, others for more stimulus.

(*e*) Then followed the stage of telling Bible stories, occupying as many days in oral work as appeared to be interesting and productive. Frequently a pupil chairman was selected who called on pupils and directed the discussion. The teacher, although in the background, was always the responsible executive, setting the general task, controlling the discussion, *holding an unobtrusive grip on every stage of the procedure.*

(*f*) Usually two days of story-telling in competition followed. Each pupil selected his own narrative and gave it in his own way before the class. All took notes on each other's performance, and at the end of the competition votes were taken by ballot to name the pupils who had distinguished themselves.

(*g*) The next step was the citation of references to the Bible in literature. During the competition in story-telling the pupils were looking for this material out of class. They were asked to find three or four or more. Some would present perhaps a dozen, all the way from Milton to the *Good Housekeeping Magazine*. The references were written by the pupils on slips of paper and handed in. The teacher read them, calling for the underlying Bible story. An amazing efficiency was developed in two or three weeks in identifying even obscure references.

(*h*) With a day or two of warning an hour was profitably spent in giving quotations from the Bible. Practice was given in stating the context from which the quotation was made.

(*i*) The experiment now turned to the invention of fiction based on Bible stories. To prepare the way for this bit of procedure the teacher explained such conspicuous works as *Ben Hur, The Other Wise Man,* and *Paradise Lost.* The pupils made

up their Bible stories and read them to the class. Possible subjects were suggested such as, a Philistine boy who serves in the army with Goliath, a slave girl of the train of the Queen of Sheba tells of the visit to Solomon's court. As soon as a pupil finished one tale he was free to begin another; some pupils wrote no less than a half-dozen stories each. A check list was used giving publicity to each pupil's accomplishment. Every pupil did something; no upper limit was placed on any one by requiring a minimum.

(*j*) Dramatization followed very naturally. Pupils were invited to group themselves informally in twos, threes, or fours to present Bible stories exactly as they were or with modification. Two or three days were given to this work. The Hagar and Ishmael drama was given with elaborate invention. David slew Goliath with much gusto.

(*k*) The class, as a rule, returned to the story-telling for a few days.

Each year this experiment, occupying four weeks' time with each class, proved a demonstration of the thesis of this discussion. Unsuspected possibilities of pupils were revealed. Pupils who could hardly give a half-dozen Bible stories with passing accuracy and readiness at the outset very frequently came through with an amazing facility in half or more of the 280 used in this unit of work. Some were able to give more than 90 per cent of them.

In every case there was work for the pupil, no matter what his accomplishment was at the beginning of the experiment. Here every pupil was an individual, not a number; also there was abundant opportunity to develop the co-operative individual.

This experiment is valuable in our discussion for what it carries as suggestion in procedures for practically all units of work in all subjects of the curriculum.

Culminating Problems or "Projects" in Established Courses.—The practice of topping out a course in science, history, or English with a large unit of work, either on the individual or co-operative basis, is suggestive. The capacity of high-school pupils to select and organize material in such adventures has been demonstrated time and again. In one direction elaborate and profitable forms of experimental work may be conducted; in another, interesting and valuable accounts of constructive and mechanical ability may be shown; in still another direction, excellent results may be had in presenting topics worked out of source material as well as interpretation of facts and conclusions gained from readings upon a given problem.

For example, in two classes in chemistry some six or eight weeks before the close of a year's course the pupils were given a choice of problems, such as photography, washing-powders, inks, coal-tar, fertilizers, garbage, cement, soils, electrochemistry, manufacture of paper. A hundred of such were listed.

The work was conducted in a manner that assured application and intelligent procedure. Each pupil in these two classes of the school in which this type of work is being carried on reported to the staff teacher each week, indicating the progress made in his topic. Two days each week were given over to experimental work on these various problems in the laboratory under the general direction of the teacher. The teacher became a consulting expert, a counsellor, a director. Each pupil in the course pursued *his* chosen problem for several weeks (some sixty hours). The pupil found it necessary to grip the principles of chemistry, and to make application of those principles in the development of his particular problem or "project."

The results of these individual studies—in some cases two pupils would work up a problem together—were exhibited in the school at the close of the year. The exhibit was open to the public. The pupils took pride in explaining their work to visitors. Charts were used to illustrate the results of this study. All this work was rooted in the experimental and demonstrational procedure; the pupil used the laboratory method in solving his problem. The literature was used as a means in working up a final report as well as in discovering the *scientific method* to be employed in the laboratory.

Much might be written to show the keen sense of responsibility pupils develop in this work. They are not sent to a task to work blindly on some artificial lesson. There is a genuine earnestness and zest in it from the beginning. The fact that the pupil may choose a problem which appeals to him is a splendid incentive. His work is controlled by vitalizing purposes.

There is unity in this work; there is variety also. The *principles* have been developed in a common cooperative procedure. *Principles* of oxidation are the same for boys and girls; there is no sex line in such matters. Each individual must do his own breathing; each must make use of the same organizing principle.

The conception of a culminating "project" is vigorously defended. It is absurd to believe that education can be negotiated in terms of original inclinations or chance interests. After backgrounds are built up and ways of thinking are developed and some technics are mastered, it is perfectly clear that individual applications may be made. This example in chemistry illustrates the point of departure. There was, also, a sound basis for shared activity. Every pupil was

interested in the progress and outcome, not alone of his own "project," but of his neighbors' work. All were vitally interested in the class discussion centred about these problems. There were both a unifying core of interests and clear-cut differentials in the experiment.

Physics, agriculture, biology, offer similar opportunities to loop up enthusiasms, and to assist boys and girls in handling effectively and productively realizations which make their appeal to youth. The spirit of inquiry and the challenge of a man's job are made to count in many valuable ways. The boy interested in radio is able under this type of guidance to organize his information and to express himself in a remarkable manner.

It may be the means of creating an abiding interest in science or invention or in some worthy vocation. The immediate value lies in the fact that such an interest serves as a dominant motive for the organization of his life. It serves for the time being as a *vocational motive*. William James speaks of one's different selves. In a certain situation some one self is dominant. During adolescence tremendous motives for recombination of selves are evident. Some dominant interest around which all the other interests cluster becomes the means of building personality. That dominant motive which serves to synthesize one's interests may be regarded as a vocational motive: it is the way the individual builds himself.

We have in mind a boy who was failing in his high-school English while at the same time he was building transformers and the Tesla coil and reading every book and pamphlet he could find on these lines. After he had succeeded in constructing his apparatus he

was able to stand up before the class in chemistry and physics and elucidate his subject in good (not correct) and interesting English. He could expound his subject for an hour or more in connected English. He did it quite as effectively as a professor in a university. He frankly admitted (a fifteen-year-old boy) that he was bored by poetry and the major requirements of the English course; yet he had read intelligently some 2,000 pages of technical matter on his particular project. The inference is not to dismiss English or anything else from this boy's *prescribed temptations*. Perhaps it is well to remark, parenthetically, that the thing of primary interest here is the fact that this boy did read and concentrate with marvellous effectiveness when his reading had in it a purpose. When the solution of a problem, real to him, depended upon the mastery of the printed page, he read a prodigious amount of it—far more than any curriculum-makers would dare prescribe. It does not mean that other values are to be neglected. Such examples serve to emphasize the futility of making a fetich of the recitation of daily set lessons. And yet it is maintained in this thesis that even the literary canon may be negotiated in a problem-solving procedure, if only the work is cast up in clear-cut purposeful objectives.

Plan in the New Procedure.—Plan in these procedures just described inheres in the processes of development. It is that interpretation of plan which is *self-originating*, *self-directing*, *immanent*, *constant*, and *growing*. *Teacher and pupils contribute through forms of associated life the social forces of control, direction, and interlocking management.* It is not an organization cut-and-dried but rather a developing impulse to unify and co-ordinate ideals.

No pupil in these experiments covered the ground of set assignments. There were nucleated and pervasive foci which served both to co-ordinate the work of the class and at the same time to offer abundant opportunity for individual challenge. If there was a wide range of individual differences at the beginning, there was even a more pronounced range of differences in achievement at the close. No one could evaluate such work intelligently without becoming impatient with the minimum-essential-content doctrine, and the lock-step uniformity of the traditional system of education.

The following tables are appended merely to illustrate possible ways of representing relative frequencies of achievement and traits. In Tables I to V the thesis of this chapter is illustrated.

TABLE I

Exercises	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Henry	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2
Mary	1	1	2	1	2	1	1	2	3	3	3	3	4	4	
Bill	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3
Susan	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2

Exercises	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Henry	3	3	3	3	3	3	3	4	4	4	3	3	4	4	4
Mary			4	4											
Bill	3	3	4	4	4	4	4	4							
Susan	3	3	3	3	3	3	4	4	4	4	4	4			
Etc.															

Table I represents a checking sheet to indicate the amount of work accomplished by each pupil in a *challenge* in geometry, continuing in this case four days. The exercises are originals selected from the text-book. The checking is done by numbers indicating achievement for each pupil each day. Exercises checked 1 represent what the pupil did the first day, etc.

Another way to keep a record of the work done by each pupil is to keep a file of small cards under each pupil's name. The challenges are numbered as well as the exercises within each challenge. Some symbol as H. W. is used to indicate home work. For work in class period a simple check mark is used.

TABLE II

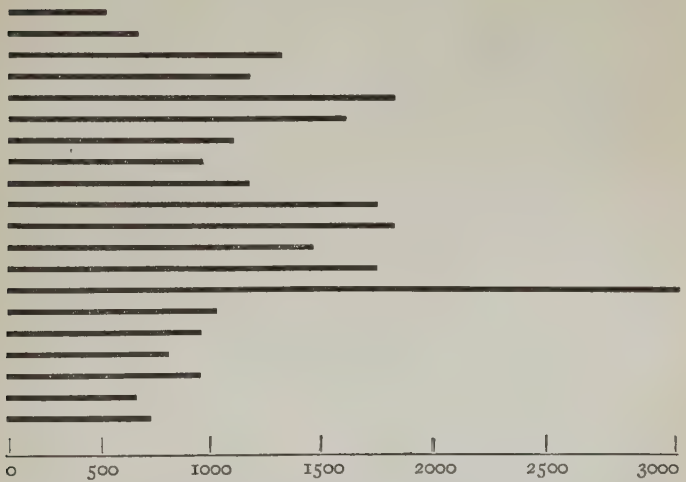

Table II represents the amounts of reading done by a third-year high-school class in French. Each line represents the achievement of a pupil. The base-line indicates the number of pages. This challenge was continued through a period of twenty-four weeks. The pupils were supplied with books and stimulated to read for enjoyment. The reading was done outside the class period. The pupil who read about 3,000 pages was doing excellent work in four studies.

TABLE III

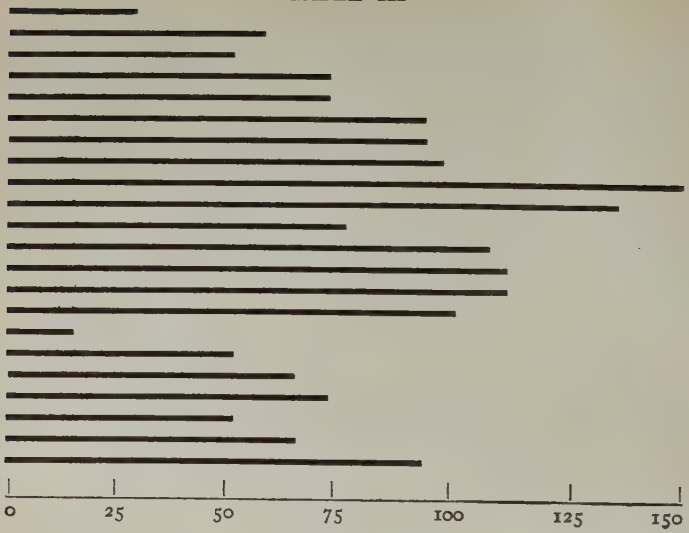

TABLE IV

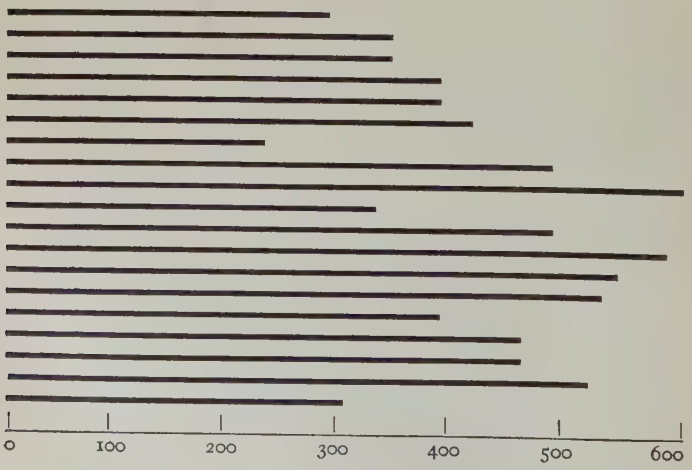

Table III represents the achievement of a class of pupils in a challenge of memorizing lines in one day in their "Julius Cæsar," 9th-grade English. The base-line indicates the number of lines. From 15 to 165 lines were mastered. Each line represents the work of a pupil.

Table IV represents achievement in a Latin vocabulary test, 8th grade, after a period of four weeks. A list of 600 words was selected by the teacher and pupils. The score ran from 250 to 598.

TABLE V

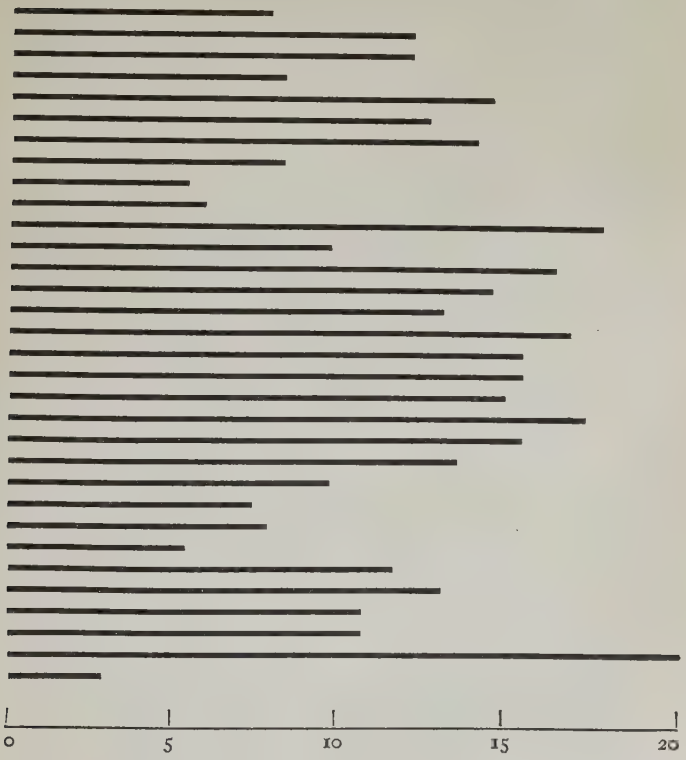

TABLE VI

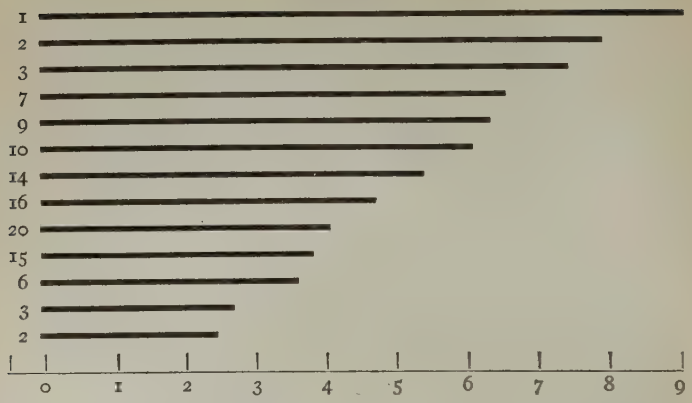

Table V represents results in a time test (Courtes test), 8th-grade class in arithmetic. Base-line indicates the number of problems: the work of each pupil is shown by a horizontal line. One pupil solved two problems while another solved seventeen.

Table VI represents rates of reading (roughly determined) of 113 eleventh-grade high-school pupils. Base-line indicates number of words read per second; the vertical column represents the number reading at the rates indicated by the horizontal line opposite.

CHAPTER V

THE DEVELOPMENT OF THE WORK SPIRIT

The Appeal in Real Challenge.—There is a wholesome and a natural ring in the reaction of the farmer boy in Charles Dudley Warner's *A Boy on the Farm* when he declares "He would gladly do all the work if somebody else would do the chores." This sane and healthy reaction of a real boy may hold the key to the solution of our problem of freedom. There is something alarmingly wrong with a vigorous boy of thirteen to sixteen who is perfectly contented in the job of *pulling little weeds*, when he might have the management of fifty acres of the farm with a challenge to *work it as he wills*.

Interest a Function of Work.—The healthy uncorrupted youth rises to a real challenge of his powers. A big realization appeals to him. It is futile to try to justify a kind of pedagogical purgatory in which a theory of "Education as Preparation" is carried out into practices in the discipline of little things—little facts to be memorized, a mass of material, unrelated to a gripping problem, to be assimilated. Then to make a bad situation no better, an inordinate amount of energy is wasted in a vain reproduction of routine matter by some formula with no provision for intelligent guessing and creativeness. So many pupils pursue the multiplication tables, geometry, French, botany in a half-hearted way with no hope of overtaking them. Interest has been conceived as some

innate quality, or as some artificial, external factor that might by some strange coincidence account for success. A saner view would seem to be that of regarding interest as a function of work. The only way to be assured an abiding interest is to create the work spirit. The job must be a real challenge; there must be something to do, a real problem, a chance to enhance self-esteem by entering upon a vital undertaking.

The Lesson-Hearing School.—The teacher who alleges that boys and girls can't think is an exponent of a very definite type of philosophy, a mechanical absolutism that makes it impossible to introduce a productive procedure of directing activity. The dogma of acceptance is defended against all criticism of results. The lesson-hearing school still holds sway; teachers hear the lessons "said," unperturbed by the enormous waste of time and energy, to make no mention of the tragic outcome of the dreary, soul-deadening process of mechanical education under collective teaching.

"The capacity of the human mind to resist the introduction of knowledge can hardly be overestimated." True, perhaps. Yet the boy in his natural state has a marvellous protective coloration in his ability to resist just that process of indoctrination. The habit of loyally co-operating with the teacher to put the hour out of its agony is still a persistent practice. The boy who whittles school furniture is demonstrating a prevailing philosophy of education. There may be little else to do. The lecture system does not escape indictment in this respect.

It is not difficult to imagine what goes on in a class conducted in the manner described by Professor Mead

in a discussion on "Habits of Work," based upon his visiting 1,000 teachers at work in one of our foremost States in education. A typical example is cited:

T. Class, come to order!
T. Henry, you may read the problem.
H. A piece of land has a frontage of eighty rods on a street. Into how many lots with a frontage of sixty feet can it be divided?
T. What will you have to do first?
H. Multiply. (Henry drawls it out.)
T. Multiply what? (Stop your laughing, Jim! Pay attention now!)
H. Rods by feet.
T. How many feet in one rod, Henry?
H. Five and a half.
T. Five and a half! Why, Henry! (Be in order over there, Sally!)
H. I mean five and a half yards equal one rod.
T. Well, you might do it that way too. *Now be careful.* (Stage directions.) What is it we're to do first, Henry?
H. Multiply. (*Henry has now arrived at the point at which he started.*)
T. Multiply what? Go ahead. (*Siphoning the vacuum goes on unabated.*)
H. Rods by feet.
T. Well, how many feet make one rod, Henry?
H. Sixteen and a half. (*Henry is being trained in the puzzle-stage of education.*)
T. Well, go on, that's right.
H. (Referring to paper.) $16\frac{1}{2} \times 80 = 1{,}320$ feet.
T. Now what must you do with the feet? (*Pay attention, class!*)
H. Change them to lots.
T. And how would you do that? *Be careful! Now think!*
H. Divide by sixty.
T. That's right, go ahead.
H. $1{,}320 \div 60 = 22$.
T. Twenty-two what?

H. Twenty-two lots.

T. That's right; how many understand? (They always say "yes" to that. A more or less interested and unanimous assent.*)

Could a more efficient system in the *training of failures* be devised? The comedian could make real fun for an appreciative audience out of the performances of Henry and his teacher.

A distinguished mathematician has said that "a few children are born mentally deficient, but a number are gradually made so by the efforts made to train their growing faculties." Any boy or girl who, while in school, is deprived of the comfort and assurance derived from an understanding of the lesson will rapidly build up defense reactions. Such a child will soon begin to resort to subterfuge if the constant strain of having to make good in examinations is not relaxed. Note how easy it is to cultivate dishonesty in a procedure that exalts in a blind faith the virtues of undigested stores of information.

The manner in which students react to favorable or unfavorable environment, that is, *the attitude displayed in meeting new situations*, is of far more importance as an indication of the general trend of activities than an analysis of the intellectual processes. "Success in education should be measured by the direction given to the emotional currents, the growth of volitional activity, and the awakening of a few abiding interests."

Obvious Need of Redefinition and Re-evaluation of Education.—Honest workmen, creative educators, not captious critics, are endeavoring to re-evaluate and re-

* Mead, Cyrus D., *Habits of Work*, Ed. Ad. and Sup., vol. VI, No. 1, p. 45.

define education. In their eagerness to institute procedures that will obviate such futile performances as Henry and his school exhibit it would be a marvel if they did not dramatize inter-dependent relations and initiative somewhat beyond our ability to realize in the immediate future. The critic of new departures would do well if he devoted his energy to a defense of traditional educational practices.

Waste in Recitation System.—It does not require an extraordinary sense of humor to appreciate the omissions in the recitation just cited. Incidentally one may well reflect upon the value of measuring the increments of "knowledge," or dabs of information, or intellectual capacity derived from such a ridiculous system. Here are some thirty boys and girls, twelve to fifteen years of age, dedicated to an education by their fond parents. This dialogue or interview is carried on between Henry and his teacher. Twenty-nine pupils are expected to *pay attention* during the farce. They must be *in order* while Henry and their teacher are doing this wasteful thing. If they are passive enough, dead enough, no cases of discipline arise.

The lava of "pedaguese" flows on in a never-ending stream with devices and "methods" calculated to assist teachers in negotiating the lesson-hearing school. "How many understand?" asks the teacher at the end of such light comedy as that above. They always say "Yes" to that. The job of keeping twenty-nine de-magnetized units *and Henry* in perfect form is staggering in itself. It is no easy trade to keep the belts off thirty human generators. These boys and girls are placed in straight rows in the mourners' benches and they are not to get out of them without specific

permission. Between the lines admonitions and exhortations are directed at Dick, Tom, and Harry, who find it rather difficult to be in order and give undivided attention to the *re*citation. Not only is Henry bound in his intellectual swaddling-clothes by a formalism and a routine of analysis with a jerky, halting, mincing question-and-answer method, interpersed with stage directions, but the other victims are held in restraint by repressive measures, dawdling away their time and energy. The whole performance is lacking in every essential condition for creative thinking.

The waste of time and energy of pupils sitting passively in our classrooms will never be adequately measured. The little fellow in the 2d grade, on being asked what he was doing in school, aptly replied that he was just waiting for the rest of his classmates to catch up. The gradual reduction of capable boys and girls to the monotonous pattern of John Smith is a process admirably designed to encourage an immense amount of intellectual loafing in all grades of our educational system. The hope of escape through classification of ability is meagre. The real difficulty inheres in the presuppositions of regimental uniformity and the current emphasis upon the consumption of ready-made "knowledge." This unfortunate situation is an inevitable result of the perpetuation of the lesson-hearing school. The upper emerging half or third of the class spends an inordinate amount of time and negative energy in waiting for the rest of the class to catch up. Many a clever fellow cultivates his initiative in devising ways of amusing his classmates in these monotonous intervals.

According to Henry Adams, nothing in education

is so astounding as the amount of ignorance it accumulates in the form of inert facts. And Mr. Woellner depicts a vivid, if mournful, picture when he says: "The old-time education considers the mind a graveyard, spacious and receptive. Data, events, knowledge of all kinds are so often dead matter ready for interment; the lesson a burial rite, a tedious ordeal, but very necessary in respectable places; the teacher, the only live entity in the analysis, a combination of divine and undertaker; the examination a sort of resurrection morning where, true to form, few resurrect." *

If the class has been assigned a set lesson of 10 problems, 5 pages of history, 70 lines of *Paradise Lost*, the conjugation of *amo*, and if the lesson has really been mastered, then there is little to be gained in the recitation of it. But Henry had not solved the problem. It is probable that he answered the first question by vague guessing. Much of what he says suggests the puzzle stage of education. He finally muddled through, *mostly muddle*. The process suggests siphoning a vacuum. Henry's train-despatcher seemed to have been off duty; little if anything got over the loop; most of his responses did not agitate anything above the medulla oblongata. As for Mary, John, Susan, etc., who were observers, sitting on the bleachers, as it were, they had solved the problem. They might have been amused; some teachers do make the dialogue rather entertaining. They certainly could not derive any permanent value from listening. Their time is usually wasted, perhaps worse than wasted, in the fact that the system of passivity makes it im-

* *A New Approach to American History*, a report of the Executive Committee of the American Citizenship League.

possible for the teacher to stimulate and guide mental life in a worth-while realization.

Futility of Devices and Methods.—The exponents of the recitation system and the defenders (*satis sapienti*) of the *status quo* have invented all sorts of devices and methods designed to counteract any such tendencies as indicated above. While *operating* on Henry, the methodologist says, you should call on Tom to answer a question; in other words, make every pupil feel responsible by a promiscuous calling for fragmentary bits of the recitation. The successful teacher, they say, uses good strategy, propounds the question before designating the pupil, makes sure of returning to the pupil who fails, with the same question, calls on all the pupils to recite (when the supervisor or inspector happens round), etc. A clever teacher can produce a spectacular performance and make it appear that there is much learning and profound interest. A vast amount of information can be acquired and exhibited, for the time being at least. The pupils may take on all the symptoms of life, and still, with all the stir of enthusiasm, fail to incorporate the spirit of the subject into their lives. Conventional and artificial standards can be met; but they can be met very frequently without real thinking, without training of initiative, without deliberate provision for creativeness. An education based wholly upon assimilation and reproduction can hardly be defended any longer.

The Pupil a Reacting Agent, not a Recipient.—Parenthetically, it may be urged that the trend of this discussion is toward securing and establishing the work spirit in the classroom. Whatever contributes to the development of that ideal is accepted as an encourag-

ing tendency. The ideal of directing study needs constantly to be protected against the misprision of its critics. With the work spirit established it will be relatively easy to pass from the ideal of the pupil as a *recipient* to the pupil as a *reacting agent.* Hence, those who are earnestly striving to bring about a more active participation of all the members of a class in the recitation system are assisting in the development of a procedure which may soon become a sane and productive departure under some such ideal as the laboratory or problem level of teaching.

New Attitude toward Discipline (Scholarship).— Above all, what is now demanded is the new teacher who will prefer to leave facts and events and persons to tell their own story, cunningly setting them in such light that the indicative of what is and of what has been shall be translated into the imperative of what ought to be. Any accredited scholarship must be *recreated* by the teacher in a system of reacting partnerships in which the pupils sit in the game, so to speak, and move because their partner, the teacher, moves in a real, human pedagogical chess game.

The old school which recognized as training and discipline the ability to stare, ox-like, a disagreeable, uninteresting, unintelligible thing, a task, out of countenance is gone. The new school believes in training and discipline that come from the pupil's effort to follow up from premise to conclusion something which mightily interests him because of its recognized and worthy purpose. Formal and systematic and dogmatic education that fails to arouse the student to self-activity, that fails to challenge to a combat of ideas, stifles the mind. The recitation of things learned

without new adaptations and applications kills mental power. If thought merely copies an existing pattern there is no hope of its becoming free. *There is practically no opportunity for the cross-fertilization of ideas in the conventional recitation and lecture systems of instruction.*

"Plausible" Learning and Spinal-Cord "Education."—The "squeaks" of youngsters and "howlers" of students, their delightfully stupid answers, furnish a measure of recreation, and sometimes suggest possibilities of originality and creativeness.

Mabel, with a bustle of busy aimlessness, just saying *everything and everything*, addresses herself to the solution of the exercise:

"If 20 pigs cost $100, what will one pig cost?"

Without thinking of prohibitive prices she proceeds:

"If 20 pigs cost $100, one pig will cost 20 × $100, or $2,000; for 20 pigs are 20 times one pig."

With a courtesy Mabel awaits the pedagogical benediction.

Only in the schoolroom are pigs bought and sold at such soaring prices. If Mabel's teacher frowns, uttering the legend, "Why, Mabel! Don't you know you must divide in a problem like this?" Mabel, with equal facility and self-complacency, arrives at the "correct" answer by bolting it by the division route.

The disquieting conclusion is inescapable: a correct answer is by no means valid evidence of thinking. The college student may be included. It is perfectly possible to go over a kind of ritual in a course and escape thinking entirely. *Don't think that just because*

a student answers correctly a question which you have asked him that he knows the correct answer.

The classical example of "taking 'em as they come" is credited to Doctor Ramsey, University of Edinburgh.

Dr. R. Bill, stand up. Read the Latin. (Scan it.)
Bill. Exegi monumentum ære perennium.
Dr. R. Now you may translate.*
Bill. I have *eaten* a monument more lasting than brass.
Dr. R. Well, then, for Heaven's sake, Bill, sit down and digest it.

There was a rule in a certain text-book on grammar which read as follows: "A preposition is not a good word to end a sentence *with*." For several winters in the old country school the writer and his teachers made faithful use of this caution rule in correcting faulty usage of prepositions. This, too, raises a doubt about *correct* verbalisms. The pupil may repeat with great facility and brazen confidence: "Quantities equal to the same quantity or equal quantities are equal to each other," *ad infinitum*, and yet be impervious to the significance of what is repeated. One may learn 150 rules of diction and still be unable to write a series of co-ordinated sentences with any degree of originality or mechanical correctness.†

* Bill, by due diligence, had pursued his lexicon to the extent of finding *ĕdo*. He noted the first of a score or more of meanings to be *to eat*. A very free translation of the line is: "I have builded myself a monument more lasting than bronze." Bill, however, allowed the first meaning, *to eat*, to monopolize his attention without regard to the meaning of the line as a whole

† Following is a part of a letter written by a 10th-grade boy. Not a word was said to him in solicitation of such an appraisal of his school, a large city high school in the Far West.

"I got a F + on my Oral English because I was late with one of my

Formal Methods.—Another type of entertainment, a bit more hopeful, is illustrated in a complex problem of discipline (management), instruction, supervision, and general procedure. The lesson was assigned, three pages of definitions and illustrations in the text on *metre*. With the more or less broken rhythmic performance consisting of directions to *stand up*, *recite*, *sit down*, the hour was drawing to a close, when Mike was sent to the office because of improper conduct. The recitation had been going on somewhat after this fashion:

T. Mary, what is an iambic verse?
M. An iambic verse is a verse that has in it iambic feet. (Mary is a *bright* pupil; she *reflects*, *mirror-like*, the printed page perfectly.)
T. Correct.
T. Mike, what is a trochaic verse?
M. Don't know.

speeches and she took off a hundred per cent. I did very poor in my English. I received a F −. I don't get anything out of the English class whatever. The teacher will turn to some unknown poem and have a boy read it (about 20 lines, part of a poem). He reads it and then she will say, 'You didn't read it very well, did you?' And then the boy is asked to read it again. He reads it again and maybe a third time. Then several people in the class will read it. Then she starts to tell what each means, using a lot of big words which mean nothing and half the class don't get anything out of it. The teacher explains about 10 lines of it and then the bell rings. So there is one period wasted.

"Then the next day she finishes explaining the rest of the 20 lines, and does a lot of talking and the bell rings again and the second day is wasted. The next day we are supposed to memorize 4 lines of it. (As we did in the last poem.) After the day or period is spent reciting the poem by heart (the 4 lines), she asks us to memorize the rest of it. And the fourth day is wasted.

"After a week of this the class gets pretty tired of it, and this same thing has been repeated. We have also written several themes of 500 to 800 words for English. But in spite of it all I will work hard during the next report period and pass with a G +."

T. Well, why didn't you study your lesson? Sit down. Now don't dismiss it from your mind! Susan, you may answer.

S. I don't know what the question is.

T. Why don't you pay attention! What is a trochaic verse?

S. A trochaic verse is one, is one— (and a touching moist scene is enacted).

T. That will do. Too bad, Susan.

T. Jim, stand up. What is a pentameter verse?

J. A pentameter verse is a verse that has in it pentameter feet.

T. Correct. You did surprisingly well. I am amazed.*

T. Now, Mike. (The book on "methods" says return to the victim.) What is a trochaic verse?

M. A verse that—uh-uh-uh.

T. Sit down, and pay attention. (Mike begins to scribble on a piece of paper. He is commanded sternly to stop it, and is ordered to manifest due respect for his teacher. It happens again and Mike is directed to find the principal's office instanter.)

Prin. What's the trouble, Mike?

M. Nothing.

P. Where did you come from, Mike?

M. English.

P. What were you doing up there? What was your lesson about?

M. Oh, something about feet; a lot of definitions.

P. Did you prepare the lesson, Mike?

M. No. (The ethical exhortation is omitted. Mike was exposed to an extended dissertation on the value of industry, etc.)

P. Well, Mike! To be specific, what were you doing at the time you were sent out of the room?

* Jim is quite a wag. He rarely indulges in the habit of study. He is quick at generalizing. He soon caught on to the author's method of building definitions. He saw that an *X* verse was a verse that has in it *X* feet. When his teacher selected him out for special recognition he was fully equipped. For *X* he simply substituted *pentameter*. He could have substituted *jack-rabbit* with equal expertness.

M. Writing something.
P. A note to your chum?
M. No, it wasn't that.
P. Would you read it to me?
M. (After gaining his composure, he reads:)
There's metre in accent.
There's metre in tone.
But the best of all metres
Is to *metre* alone.
(At least a sign of originality in the use of *metre* in the last line!)
P. Now I shall have to *punish* you. If you don't get to work and write a few more stanzas you will have to see me at four o'clock.

Without moralizing, it seems pertinent to remark that, actually, the only pupil in that class who was even making an effort to produce, to create, or to apply anything was deleted from the group. The discipline of the room had to be maintained. *To metre alone* suggests the proposition that the pupil should become the educative unit. Then it would be clear that our task is to co-ordinate and unify our ideals, principles, and organizing *X's*, through a productive sharing of experiences in a discussion procedure where publicity of results may be made a temptation to excellence, and where emphasis is placed upon good work.

A Procedure for the Release of Potentiality.—A teacher of the new day began the new challenge by reading some ballads. He tapped on the desk and read to the rhythm of a galloping horse. His pupils got into the rhythmic swing and began tapping their feet on the floor. He said: "Good! Come on all of you and keep time, tapping it lightly on the floor." He read several selections.

Then he remarked: "If you really enjoy this read-

ing, come to the desk and find a ballad that you would like to read." He had brought to the class an assortment of books for the occasion. Before the hour was up the class was reading in a half-dozen groups, a leader in each one taking responsibility for the order of reading.

The next day this teacher said: "Suppose we write some ballads ourselves." They did so. Thirty pupils in that class actually produced readable ballads. Even the poorest one did not need to be expurgated to make it decent. Here is one of the three best, written by Eleanor, thirteen years of age, in a 9th-grade English class:

YE WOEFUL BALLAD OF FAIR ISABEL

Fair Isabel of Rockloyal
At her window stood alone,
Gazing the way her lover rode
When he to the wars was gone.

Her maids came in and sang to her,
But she dreamed the livelong day.
Suitors came and courted her,
But she turned them all away.

He had kissed her there and left her
With a promise to be true
And as he had loved, so e'en had she,
And so she had promised too.

One day as she sat in her chamber
She heard a step in the hall.
Her hopes arose for her lover,
But 'twas a herald gaunt and tall.

"Hark ye," he cried, "I come from far
Bringing ye news from the wars.

Your lover lies slain on the battle-field
Across the English moors."

Her lips grew white and her cheek turned pale
In a deadly swoon she fell.
Naught that was done could restore her
And of grief died the fair Isabel.

Eleanor's mother related her experience the day after. She remarked that Eleanor went to the study table and began tapping her pencil. When asked what it meant Eleanor replied that she was trying to write a ballad. The mother thought it was a foolish assignment, quite beyond the capacity of her elder daughter, then in college. Eleanor apprised her mother that the teacher had said: "Would you like to write some ballads?" That made a difference. In about forty minutes after starting to write, Eleanor read the ballad as it appears above to her mother. It may be worth while to talk about the particular metre and perhaps use the conventional terms after the pupils have worked into some creative self-expression. Suffice it to say that the bare bones of definitions will assist no one in writing anything.

Of course Eleanor's poem was the best in this class. But the doubting Thomases should be reminded that there is no reason why the standard of achievement and qualities attained by a few individuals should not become the average of the class. That is the meaning of evolution: *the individual exception becomes the type of the race.* Effective freedom is the ideal toward which we should be striving. Only an infinitesimal fraction of human power has been applied to the task of development. All that is hoped for in the

full release of every wholesome potentiality will not come in a day; the process has been choked by self-created obstacles and repressive measures of external disciplines in home and school, and by far the larger proportion of the progressive effort has been spent in overcoming them. Huge sources of power await liberation in every child. The real problem is the development of a technic by which creative thinking may be achieved.

Converting a Formal Recitation Procedure into a Directed Challenge and a Co-operative Movement.—Let us take now an illustration of the formal recitation mode under collective teaching and convert it into a procedure a little bit more hopeful and more productive than the usual question-and-answer method. The class was a first-year Latin section. The teacher began in the usual manner, calling on pupils to rise singly, give principal parts of a verb, sit down, next, etc. After ten minutes, disorder began to disturb the procedure. At this juncture a sympathetic educational associate who was present suggested that the pupils step to the blackboard. He asked the teacher what the objective was in the lesson. After some hesitation and confusion it was revealed that it was concerned with a review of the principal parts of Latin verbs. Very well. The pupils had written their names on the board.

"*Now* [to the teacher], *what are you going to do next in this situation?*" It was well done. The pupils were asked to write to 10 in a column under their names, and then to write as rapidly as possible the principal parts of any 10 verbs. In two minutes Jane was finishing; John was coming along, nip and tuck. Jack over

there, who had been generously reminded in the first part of the hour that he ought to study, etc., was about to collect enough information out of the corner of his eye to write the second one in his column of 10.

Again, the associate asked the teacher: "What are you going to do next in *this* situation?" And it was an interesting move on the new chess-board where pupils and teacher were becoming reacting individuals in a moving stream. This was the suggestion: "Carry on; number on up; go as far as you can." Within ten minutes Jane had written the principal parts of 48 verbs, John 40, and Jack had accumulated data for a stab at 3. Other pupils ranged all the way from 12 to 37.

Again, "What are you going to do next in *this* situation?" The next move, and it was the teacher's move, was brilliant. It was: "Move one place to the right." It happened that Jack was faced up against Jane's array of 48 verbs. He was heard to remark: "Gosh! What a girl Jane is!" And that makes a difference too. The pupils checked any number in which there was an error. Albert, in front of Jack's contribution of 3 verbs, finished checking at a glance.

Again, it became the teacher's move. "What are you going to do next in *this* situation?" An excellent thing was suggested in having Albert hear Jack pronounce the principal parts of the verbs in Jane's array.

The hour was soon over and there was work still to be done. The pupils had been told in the checking to use their books if they were still in doubt. Already the turbulence of doubt and inquiry had appeared. Any pupil finding a word in his work incorrectly checked entered a vigorous protest. The book became

an authority and was used to settle the case in point. Some doubtful forms were left for further investigation.

A Basis for a Moral Responsibility in Procedure.—How stupid it was to fuss with Jack before the class as a whole in a recitation mode! Think of those pupils in the illustration just cited who were able to write from 30 to 48 verbs with their principal parts. To express it in the Greek idiom, under the old procedure: "Having been cut off as to their heads, they died." The teacher needed to be emancipated, to get above the fragmentary unit of question and answer in terms of isolated brute facts, and to see in some perspective the large objectives.

The whole situation was changed. The teacher realized that a detailed plan-book was a handicap. A log-book in those uncharted seas might be kept with profit. This teacher began to grow when she recognized the significance of putting to herself the question: "*What shall I do next in this situation?*" This question, projected constantly into a progressive series of developing situations, fosters a continuous moral analysis. It is a dynamic in the development of a keen sense of responsibility.

Teaching and Learning, an Integration of Actions.—A suggestive hint comes from the modern conception of economics in the matter of buying and selling. In the old school these aspects of trade were considered as two separate actions. The pernicious effects of this old doctrine are felt to-day in the complex and agonizing problems of capital and labor. Now, in theory at least, it is recognized that it is not a transaction between buyer and seller but rather an inter-

action. *My selling is your buying looked at from my point of view; your buying is my selling looked at from your point of view.* So it is in the educative process. *My teaching is your learning looked at from my angle; your learning is my teaching looked at from your side of the shield.* Teaching and learning are, in this view, the front and reverse sides of the same sterling coin. It is not a *transaction* between two parties, but an *interaction* of mind upon mind.

The practice of conceiving teaching and learning as two separate actions which make the *transaction* by a mechanical addition, and the notion that each of these actions can be subjected to a moral evaluation in its own right, must be regarded in any social interpretation of education as a possible source of a whole progeny of pernicious mistakes. Just so long as status exists, and teacher-mind is contrasted with pupil-mind, there can be no fruitful application of the social principle to educational practice. Separate these functions of teaching and learning, and nobody is responsible for results. Really the language is highly figurative and still misleading. The teacher who is not learning, who is not being rejuvenated in this interaction of social life with his students, is in grave danger of becoming a pedagogue and a pedant.

Indeterminate Character of New Procedure.—It will be remembered that the formations in the class above were constantly shifting. The new situations, the "deeds to be done," cannot be predetermined. The nub of the whole matter is that this class was converted from a state of passivity to a working group. The *work spirit* was created. There was a wholesome contagion of work developed through the interaction

of mind upon mind in a spirited challenge. When the bell rang it was not a signal for a sigh of relief but an expression of surprise that the time was up so soon. Every individual became a reacting agent. No upper limit was set for any one. The challenge was not finished as a job is finished. The dry bones of minimum-essential content were not being rattled about after the pupils were geared up into action. *Minimum essentials always become maximum necessities, and tend to suggest strongly to both pupils and teacher the notion that things in education can be completed and set aside and practically dismissed from the mind as piece-work is finished and checked off in the factory.*

True Sportsmanship in a Co-operative Undertaking. —The procedure toward which the illustration on the principal parts of verbs points is a procedure of reacting partnerships. The teacher actually plays the game as one of the players. The exact move cannot be predicted in advance of the experiment.

Even on the chess-board no one commits to memory some 33,000 possible formations, and plays the game by carrying in cold storage all these possible combinations and permutations.

The expert chess-player, playing thirty games simultaneously, does not carry in his memory the positions of the pieces on the several boards as he walks around in the group from board to board. He sizes up the situation at a glance and makes the next move.

Any art or profession always requires just that sort of creative ability. It is perfectly futile to attempt to store up in the rag-bag of memory 33,000 possible combinations and permutations in which inert chessmen may be placed, and then in the game dig down

into this rag-bag of memory and pull out an old movie film to be used in the new formation resulting from the preceding move of the opposing player. Actually a new movie film must be created for the new situation, if it is a life situation. The intelligent mind meets a fresh difficulty by a creative synthesis, not by a mere copy formulated in advance.

The chessmen have no will of their own. They stay put. The boy moves. He is not a lock-step man in the making. And in the intellectual game, as well as in the chess game, the expert player will not be bent on checkmating the learner, the beginner, so much as setting up new situations which keep open a gradual, progressive experimentation with emphasis on *trial and success* and growth in the direction of successful experiment. To be sure, the amateur ought to be checkmated, now and again, both to demonstrate expert ability and to give pith and point to good sportsmanship. The converse of this proposition may be demonstrated with profit. "A sportsman is one who takes his chance when he *ought*, not when he *can*," and whoever can define sportsmanship can define that which animates and differentiates English education. "The sportsman shall not aim at the *sitting bird* nor strike the fallen boxer nor quench the smoking flax. True sportsmanship sweetens the competition of life, is long-suffering in action, and is not puffed up in reminiscence." *

"The Boy Moved."—The delightful story is related of a great thinker who was fond of golf. His difficulty was an inability to find the ball or to orient himself to the general direction of it in his drive. A fellow

* Shane Leslie, *The End of a Chapter*, p. 159.

philosopher suggested to him that he ought to sight by some object when he took his position for his drive. "A good idea," he said. But there was a repetition of his old difficulty. He sighted by a single object. When asked if he sighted by an object, he replied that he did: "*I sighted by a boy*," said he, "*but the boy moved.*"

The school too generally prepares itself to meet an abstract average boy. It is not enough to know the boy's name. It is rather difficult to make a statement of what one really knows about a boy in his natural state. The artificial schoolboy can be defined; the real boy eludes definition. The fact is we must *see* the boy in novel circumstances in order to discover how he behaves. He does not carry, as baggage, an assortment of original traits which appear, as such, in the processes of his changing, growing life.

The boy, moving up into the canyon, prospecting in geometry, this hour, is a new boy; he is in the process of *becoming* what he otherwise would not be. A change is being effected in his life. So it is in every part of the curriculum which is actually being incorporated into his thinking.

This boy, measuring angles, that boy actually producing and creating his own Robinson Crusoe, this girl fabricating the ballad or story, that girl pursuing the multiplication tables—all such situations are novel, no matter how many different individuals have faced similar problems or how often the same individual has ventured to think the same problem.

It is a changing world, not a fixed and final world in which the individual moves. The teacher needs to think of the boy and his first adventure in a new study,

or, for that, any study or any part of it, as constituting a new situation demanding a reconstruction of experience as the only possible attitude of mind. Any situation that can be met without it involves no vital difficulty or real problem, and when that is lacking for either teacher or pupil, what is done is of no consequence, and it were even better if it were not done at all. The experimental method carries with it a tremendous responsibility; without it, the validity and value of what is done should be challenged.

Activity with a Sense of Direction.—In passing, therefore, from the primacy of subject-matter, *as such*, and accredited methods, *as such*, over to the primacy of boys and girls *at work* we must be prepared for ever new formations. The general direction must be sensed by the teacher. As pupils and teacher advance, organized as a real prospecting party, they find themselves at the *fork of the road* with every new adventure. They must choose a way and take the consequences of the choice. In a real sense it is the city that determines the general direction of the road; the road does not determine the direction of the city. With the city in mind the building of the road is given a direction. To strain the analogy for what it will bear the building of the road is never completed. Economy of transportation requires radical changes in the old roadbed. What seemed to be insuperable obstacles in pioneer construction are now met with courage and determination. The tools and method of modern science have made possible improvements surpassing the wildest dreams of the early builders.

Applying the analogy in one direction the slogan would be to assimilate in the shortest possible time,

with the least effort, the greatest quantity of the most important matter. Such is the suggestion of big business—an excellent idea, provided assimilation does not become the end of education. Merely to be active in building or improving the road under the immediate and constant direction of the foreman reduces the performance to the level of a job in which artificial stimuli must be employed to induce the worker to go forward. Or, to put it another way: suppose a person had all the facts, and nothing but the facts, what would he do with them?

The city, the ideal, the goal must be an objective toward which all are striving, and the humblest worker should be given an opportunity to gain an appreciative understanding of the co-operative drive toward real objectives.

The pupil, in other words, is not to be carried, without effort, swiftly over a beaten path toward his rich social heritage. Each individual must build for himself his world, and express the values of life through the achievement of his personality. He is not committed to a world fordone in which his chief task is to become adjusted to what *is* in a world of absolutes, but rather to *become* the responsible agent in dealing with a world of changes by directing *and controlling forces under the driving power of the will to progress.* This, the *will to progress*, is more important than the *will to live.*

Dewey's expressive figure, "At the fork of the road," suggests the moral hazard in teaching. What to do next, if education begins at the point of crisis, cannot be reduced to blue-prints and plan-books. Confronted with new situations, responsibility for the exercise of

initiative in choosing some productive *next move* rests definitely upon the teacher—a responsibility, however, which may be shared by the pupils.

Opportunity for Self-Expression in the New and the Old Procedure.—Returning to the redirected class, wrestling with Latin verbs, all pupils were given full opportunity for self-expression. The teacher working into a half-dozen major suggestions for *some next steps*, instead of agonizing along with 100 or more choppy questions or commands directed at some individual, became at once a *guide*, a *consulting expert*, a *director* of activities. Each individual had a chance to do his best. No one was held back on account of a slower one, or one who was duck-backing an education. The opportunity was offered, too, for the development of partnerships. All sorts of groupings are immediately possible in the expansion of the procedure initiated.

Norman MacMunn, a teacher of French, has very pertinently pointed out that the average time given to oral expression in the recitation system does not exceed one and one-half minutes daily for each pupil.

> The actual loss of speaking-time enjoyed by each boy under the old [collective teaching] as compared with the new system [partnership teaching] is simply immense. I suppose most masters have realized that in a French class of twenty, if they themselves speak half of each hour, a boy has only one minute and a half in which to express himself! Is it any wonder that even after *seven years* of exiguous practice he is frequently at a loss to frame the simplest sentence? I am surprised that he speaks as well as he does, considering that his actual conversational practice in those *seven* years has probably amounted to something like twenty-four hours.*

* MacMunn, Norman, *A Path to Freedom in the School*, p. 38.

With thirty pupils and a teacher who talks excessively it would be difficult to find *one minute* for each pupil.

Doubtless nine out of ten of us who have studied geometry and, incidentally, have thanked God that we are done with *that*, memorized the theorem and in the proof reproduced the steps by which some one else —the author, the teacher, father, or mother, or fellow pupil—had come to his conclusion. For most of us a triangle suggests a definition running something like a plane surface bounded by three straight lines, accompanied by a survival of a few dim visual patterns depicted some years ago out there on the blackboard or in the book, remembered, if at all, as a mere copy.

The boy who defined *his triangle as a thing to think with* was about to escape intellectual paralysis, and actually to gain a functional meaning of *his* mathematics.

A refreshing point of view is gained in working out "Education as World Building," * *e. g.:*

I study Euclid's geometry. It is simply an occasion for *me* to make *my own* geometry. *I* must *conceive* a point, a line, a plane, a solid. *I* must *feel* the necessity of regarding the sum of the angles of a triangle as two right angles.

If Shakespeare shares his meaning with us, why do some say Hamlet was mad and others that he was not mad? To Shakespeare he must have been mad, or not mad, or both together, and if we simply take Shakespeare's meaning (or the teacher's or some one else's) it must be only one of these that we can hold, and Hamlet should mean the same definite personality to us that he meant to Shakespeare. There would be no room for scholars' quarrels if truth were handed down in that way. The far greater service that he has rendered, the service

* Moore, E. C., *What is Education*, chap. IV, and particularly p. 131 *ff.*

of every artist, inventor, lawgiver, and *teacher* renders, is just the one that my friend renders when he converses with me; namely, that of providing materials of experience for me to interpret.

The Beginnings of Co-operative Teaching.—So one may go on urging the proposition that the pupil must learn *his* French, *his* English, *his* science, *his* history, etc., just as he learns to lace his shoes, and that way is by lacing his shoes. *He grows along the line of successful experiment.* It occurred to MacMunn that his boys could not learn to speak French by a vicarious method. They needed to hear him speak it correctly; that is granted without dissenting opinion. But, just as pupils in English classes gain practically nothing by listening to desultory essays and exhortations on correct style, so in a foreign language pupils do not learn to speak it if the teacher does all the speaking.

The suggestion has already been made in the procedure discussed in the redirected Latin class that productive partnership teaching could be inaugurated without having a "Wild West show" or a "bear garden." Any intelligent person will draw a valid distinction between the normal wish to "paddle one's own canoe" and a neurotic craving for relief from any form of restraint. A joyous contentment in a real, not a fictitious, freedom should be diligently sought. The development of courage, initiative, originality, wholesome self-assertiveness is possible after the "constitution is adopted." Vital education in a democracy finds no insuperable paradox in *Authority* and *Freedom.* Obviously groupings can be productively worked out with the caution that groupings are tentative and *that a so-called socialized recitation which is not at every*

stage within the immediate grip of the teacher is an educational tragedy.

Illustrations of procedure in which opportunities are offered for partnership teaching have been suggested. The application of the conception of *emerging* leaderships, the recognition of *emerging* power and capacity through gradual and progressive experimentation, will enable the new teacher to introduce the sound principles and practices of a *shared life.*

Albert was perfectly competent to hear Jack pronounce the principal parts of the verbs in Jane's contribution (see page 190). Jane was ready to take responsibility with a group of four pupils over in the corner of the room to practice with them in giving each other the principal parts of verbs. The first acid test of a vital class period is the *work spirit.* The dust of industry is a good sign. The teacher is included in this test. The practice of setting a uniform task and devoting a part of the class period to a uniform study of it, to be followed by a *re*citation of a set lesson, is the surest possible method of producing an idle, supervising teacher whose primary business is to perform police duty.

The daily set-lesson assignment must give way to the *indeterminate,* yet very definite, challenge. Let us go back to the boy on the farm who was willing to do all the work if somebody else would do the chores. Give a real, aggressive boy daily assignments in *pulling little weeds* and he will leave the farm, and despise it the rest of his days. Give him a fifty-acre realization with a full co-operating share in the responsibility for its management, a real challenge and an indeterminate assignment, and "it's dogged that does it" with a chal-

lenge in which he appreciates the necessity of hard work, and, if that boy leaves the farm for profession or business, he will always cherish a desire to return to it.

In the one case he must be driven to his chores, heckled about his habits of work. It becomes a monotonous routine, a tiresome repetition. To be assigned little jobs, daily, kills initiative in the worker. There is no vision in isolated, set tasks. In the other situation, a man's job makes its appeal to the adolescent. A challenge does not deal with perpetual rest cures. The field is to be ploughed and prepared for the crops; the crops are to be cultivated, harvested, and marketed. A chain of purposive activities runs through it all. There is a linking up in the mind, a series of progressive concretes which enter into the total achievement. It is the spirit of challenge, the dynamic of a big, worth-while realization that appeals to youth.

The daily grind resulting from superimposed tasks unrelated to any vital self-appreciating, self-initiating purpose is fatal to self-respect, pride, initiative, industry, resourcefulness. Moreover, artificial rewards and external pressures are resorted to in the attempt to create interest in the daily assignments. Boys in the process of being corrupted have to be paid (bribed) by their parents to do the little jobs about the home and on the farm. A genuine sharing of the responsibility for the planning and working out of the large enterprises of the home, the farm, the business captivates the boy's imagination and enhances his self-esteem. He is made to feel that he counts and that his ideas are valued and appreciated in an honest partnership.

Somehow along this route the release of potentialities is going to be realized. By starting with the big realization, the challenge, and keeping it focal in the experiment of bringing up boys on the farm, and elsewhere no doubt, the chores will be done; the weeds will be uprooted in a new spirit when the emphasis is shifted to the values of the crops. This rough analogy should not break down entirely when it comes to a looping up of facts and dabs of information in a purposeful challenge in education.

A Real Questioning Process.—Much ado has been made in recent years over fact questions and thought questions. The real issue does not seem to lie in that direction, for it makes little difference if the landfall has been prearranged. To propound a thought question that does not become the pupil's thought question tends to emphasize the old order in which a transaction, not an interaction, is made. If the question is already answered on the printed page it is really not a thought question. *In reality, the answers precede the questions in the prevailing practices in education.* To get a real question in front of some potential answer is a most difficult task; it is a task imposed by the scientific method. Usually the book contains the information and the conclusions ready-made; the learner is required to exercise powers of memory for words and phrases and some discrimination in shades of meaning. Yet a child in the primary grades before reading *Robinson Crusoe* or being told the story is able to create *his* Robinson Crusoe by skilful questioning.*

* Hall and Hall, *The Question as a Factor in Teaching*, see Intro. and chap. I.

For example:

Teacher. Once there was a man left on an island all alone. How did he get there?
Pupils. (They will find a way.)
Teacher. What shall we call our lonely man? (It makes no difference what we call him in so far as our thinking is concerned. The teacher proposes the name Robinson Crusoe, and that suggests a need and a way of *socializing* subject-matter.)
Teacher. (Later in one of the developing challenges.) One day *your* Robinson Crusoe got sick. What could you do in your home, if you were sick, that *your* Robinson Crusoe could not do? What would he do?
Pupils. (They will work it out.)

In other words, we are endeavoring to suggest a way of getting some question in front of some *potential* answer in situations which stimulate and encourage pupils in creative *thinking*. The material of Defoe's Crusoe can be utilized; after the pupil has produced *his* Crusoe in some one of the hypothetical situations suggested above, the material of the book on that situation might be read or related with profit side by side with the child's contribution. The story of Robinson Crusoe furnishes, in a sense, the *motif* for history. The teacher who, in dealing with the narrative of history, could cast up now and again situations to which the pupil might react in terms of his creativeness would soon find a gripping dynamic in the interpretation of history. All through the unfolding of the inspiring national panorama opportunities arise for stating a few salient situations, a few outstanding facts and guiding principles which may be utilized in a procedure intended to direct and stimulate the pupil to project

his judgment in a possible or tentative solution. An occasional departure in the Robinson Crusoe method would tend to obviate the mechanical practice of impressing upon the minds of others a slavish copy of the doctrine taught and, also, the danger of falling into an uncritical absorption of information would be counteracted. The teacher who will make the adventure in the Robinson Crusoe method with any child or group of children will "see visions and dream dreams" in the land of educational possibilities.

The entire Chapter XI in Dewey's *How We Think*, dealing with "Empirical and Scientific Thinking," should be studied in this connection. What the teacher is doing in such procedure is to fabricate a very definite organization of circumstances to which the pupils respond; or, if the analogy of the chess game is apt, the teacher moves and thereby creates a new situation which calls for a purposeful response from the other players in the game. Scholarship for the teacher is actually recreated in the interaction of social life. So much is offered as "substance of doctrine," and for suggestion as to departure. Not all stories are to be handled as this one is here; but by making provision for productive, creative questioning in a few instances, a distinction will be gained between education in terms of telling and absorbing and education in terms of creative thinking.

"Freedom of thought implies, among other things, that the teacher of anything from the '3 R's' to theology provokes the originality of his pupil not as a recipient but as a *reacting agent;* accepts him as the predominant partner in the work of education, and aims at a result which shall contain a large contribu-

tion from the free activity of his mind. Under genuine freedom nothing can be further from the aim of the teacher than to impress upon the minds of others a slavish copy of the doctrine taught, *even though this should happen to be the doctrine of freedom itself.*" *

Freedom of thought, therefore, does not mean merely that every individual is licensed to address his opinions to the world in unlimited monologue. Think of the lecture system and the recitation system! The procedure that employs to some extent the principles arising in productive conversation may be the means of creating this originality or the means of developing a true freedom through the release of personality. In this view freedom comes to mean capacity—real power coupled with responsibility. Through a system of reacting partnerships may we not expect the development of an individual who can really *think?*

"The amount of intellectual activity is enormous; *but of creativeness, which is the mark of freedom,* there is remarkably little."

Possibilities of Problem Method.—Beginning with this Robinson Crusoe method a scale may be built up, culminating in the method of Agassiz, who, it will be recalled, lifted his teaching to a very high, independent project level when he gave young Bigelow the triolobite to work on. Without instruction, lecture, or readings, without a microscope and a book of detail and drawing of what he was to see in the microscope, the student just had to see it and describe it himself. Along the scale, particularly in the junior and senior high school, co-operative challenges, without a deadening uniformity, should be emphasized.

* See L. P. Jacks, *Alchemy of Thought.*

A gradual elaboration of the procedure just illustrated can be developed. Greater attention should be given to approximations in teaching mathematics, with perhaps no less emphasis on cold figures; much could be done in the interpretation of figures when applied to the ambiguities of life.* History may be taught in vistas; the brute facts may be looped up in social problems having, at least, a vital connection with the life of to-day.

We have now come to terms with pragmatism and creative evolution, and we see that to study botany means that the student is to become a *botanizing* individual; he is not to assimilate what specialists have to say about botany and learn merely to recite it with a lip-service to knowledge.

In all this it is well to keep an unclouded perspective of the scientific method, the general theory of which is applied by the artist and the sculptor, as well as by the modern experimental scientist. First there must be a problem for solution, a question to be thought about. Always there must be a way of thinking; an hypothesis is simply a way of redefining the problem.† The facts that seem to bear upon the problem or question must be examined in a process of thinking; as they are examined the hypothesis itself is constantly redefined.

The circle is a function of the radius; the radius does not stand in a causal relation to the circle. The weight is a function of the fulcrum. It is only in the support of the claims of status and erudition that brute facts, mere information, could have significance.

* See Kenneth Richmond, *Education for Liberty*, p. 70.
† Moore, E. C., *What Is Education*, pp. 202 and 245*f*.

Words or language must be conceived as a function of abstraction, if their true dynamic significance is to be appreciated. A barren fact, isolated from all organizing principles, problems, or questions, would be an anachronism in any interpretation of education vitally directed toward creative intelligence.

An infinite number of bonds can be built up in the lower nervous centres capable of handling simple cases of stereotyped situations and responses. 7×9 and 63; Declaration of Independence and 1776—literally thousands of these bonds can be tied up by a direct mechanical method in a deliberate programme of schooling.

An unintelligent mind can be trained to an astonishing degree of efficiency in the reproduction of *correct* answers to stereotyped questions. The question in this usage is nothing more than a repetition of some code intended to produce a situation to which there is a hand-me-down response.

Our critics will immediately urge the absolute necessity of acquiring facts and information, as such, and will enter into an elaborate defense of systems and methods calculated to free "the lady who is the genius of our tongue." And yet with all these earnest strivings after results and standards one of the most common indictments teachers make in any administrative unit or course is the indictment lodged against the educators in the preceding administrative unit or course to the effect that the "students don't know anything."

Complete statistics which would tell us how many of all the pupils who study Latin, algebra, and geometry fail to master them do not exist. But we know that a large percentage of the

better students of these subjects try the college-entrance examinations, and that for these examinations many receive special drill in addition to regular teaching. Now in the examination held by the College Entrance Board in 1915, 76.6 per cent of the candidates failed to make even a mark of 60 in Cicero; 75 per cent failed to make a mark of 60 per cent in the first six books of Virgil, every line of which they had presumably reread; 69.7 per cent of those examined from quadratics on failed to make as much as 60 per cent; 42.4 per cent failed to make 60 per cent in plane geometry. What would the record be if all who studied these subjects were thus examined by an impartial outside body? *

This quotation from "The Modern School" is misleading in the fact that only three subjects are selected. The results in other subjects of secondary education are just as illuminating. Furthermore, an investigation of the four years of collegiate training beyond the high school might disclose results quite as interesting.

The general method of assimilation under the lecture system is ordinarily a continuation of the recitation process. The main emphasis throughout these eight years is assimilation and reproduction of information and conclusions of others. The attitude toward the printed page throughout this period is essentially the same; the primary emphasis is assimilation of subject-matter. This is not true in the modern tendency and practice in the teaching of geometry, for example. There has come about in the past three decades a shift of emphasis, in that theorems and propositions with elaborate proofs are not memorized and recited as formerly, but theorems and propositions with a few hints for proof are now being used as tools

* Flexner, *The Modern School*, p. 6. See also an article by the same author in the *Atlantic Monthly*, April, 1917.

in the solution of original exercises. The main emphasis is being transferred to the exercises. Other subjects in the curriculum are beginning to be approached in a similar manner.

A prominent college professor of history became sceptical about his lecture method and assignment of readings. He concluded to equip his classroom with books and other materials and have his students report there in groups of fifty for laboratory study and direction. He worked out a plan of *directing study* for college freshmen and sophomores. He knew within two or three weeks after the opening of the semester something definite and fruitful about the habits of study and working powers of his students. The lectures were continued, but they became at once material to be worked up by the students in the solution of problems in the study of which the professor of history took an active part in directing the work of the laboratory. For this college professor open season for condemning the high school was closed.

The argument for a productive form of co-operative learning with the emphasis deliberately placed upon power to think does not telescope the significance of information and accredited scholarship. In fact, the plea is for a rational use of data and a rational dependence upon authority. By a looping up of facts and information in a driving, purposeful, thought-provoking problem, question, challenge, or project it is maintained that an infinitely greater amount of accredited information will stick to the intellectual ribs of our students. The main emphasis is not, however, on capacity to accumulate and reproduce ready-made knowledge and accepted conclusions.

Recitation Subordinated to a Forward Drive.—The effect of developing a class period in which the dominant idea is that every pupil shall be at work is altogether wholesome. The longer class period of sixty-five to seventy-five minutes can be justified under the laboratory procedure. Recitation, simply as an end in itself, is reduced to a minimum. The pupil engaged in the passive art of listening and paying attention is not found in the new school. The capacity to recite the conclusions of another or of a book is clearly subordinated to a demonstrated ability to use these ready-made conclusions and all sorts of facts in attacking a problem, topic, question, experiment.

It becomes infinitely more important for the new teacher to see that problems are properly raised than to hear lessons "said." The programme of directing study enables each pupil to go forward with his problem at his own best rate. The interests of the class, as a working group, are unified and co-ordinated through discussion and by means of common organizing principles which constitute the ways of conceiving or thinking the problem or challenge. Work, intelligently begun in the class period, may be rationally continued out of class. The teacher is concerned not only with these common organizing cores of a given course, but also with the thinking and tangible progress of each pupil. *Class discussion is a form of activity toward which the movement of a given topic or principle should tend; it may be made productive after pupils have worked into a problem or challenge.*

Eliminating Waste in Recitation.—The disposition to *receive an education* is no doubt cultivated through excessive explanation, through the presentation of

finished and complete copies of thought, and by a passive and uncritical acceptance of the moving-picture variety of instruction. The finished demonstration of a problem in geometry or a detailed discussion of an experiment in chemistry has little value for the student who has made no effort to master the problem or experiment. The practice of assigning the next ten exercises in the book as a set lesson to be studied out of class, and then on the following day writing the solutions on the board and using class time in *saying* them over from the board, is a practice having little value for the pupil who does not understand what it is all about, and probably no value for the pupils who do understand and who have diligently prepared their lessons.

After working into the challenge it is desirable and profitable to have the whole class participate as some one presents a good demonstration, reads a good story, or executes a bit of fine workmanship. Competition, emulation, pride are given a dominant emphasis through judicious praise and publicity of results.

It is an uneconomical use of the class period to require the whole class to listen to shoddy, indifferent, muddled explanations of some pupils, just as it is a sheer waste of the time and energy of pupils to compel them to pay collective attention to the performance of extracting information from a boy whose mind is apparently empty, or who is considered impervious to learning, or who for some reason is *hors de combat* before the class. It is maintained that no normally constituted individual is destined to continue a failure. Any inference here that any such pupil must remain a bungling performer is wholly gratuitous.

Summarizing Statement.—Two major considerations are beginning to emerge in our discussion. The first is a partial socialization of procedure in which certain informal arrangements are made from time to time for a mutual sharing of interest, co-operative learning, various forms of mutual teaching and group work. The second relates to a functional interpretation of subject-matter; and the aim is to substitute for the rigid set-lesson assignment with its dominant emphasis upon regimental uniformity the indeterminate challenge lifted to the *problem level* or *case method* of teaching. Both of these aspects of directing study, as interpreted in this discussion, are tied up in a deeper unity suggested in the view that the class period shall be converted into a work period in which the pupil passes unequivocally from a *recipient* or *spectator* to a *reacting, participating agent.*

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CHAPTER VI

APPLICATION OF THE SOCIAL PRINCIPLE

Unreliability of External Criteria of Supervised Study.—In making explicit and deliberate use of the social principle in the development of procedures the formalist will look in vain for external and arbitrary patterns by which to carry on the activities of the class. Just what are the inescapable earmarks of *supervised study?* The insistent demand is to explain the machinery. Device-minded teachers and supervisors may be expected to look for some stable and persistent signs by which to know that whatever bears the stamp of *supervised study* will be that and nothing more. The mind that operates with its x plus y equals z, in a fixed algebraic world, will demand a precise x and a definite y; for it is only by having fixed external truth that such a mind finds security.

So we have the superficial reform of a "socialized recitation" with some tangible machinery of self-government, a pupil presiding and calling for recitations or some other sign of pupil responsibility. Or again, we find some school naming what it does supervised study, and receiving advertising that *what is named it is it,* when the only tangible evidence of a supervised-study procedure is a division of the class period into two equal parts, one-half of which is devoted to the study of the lesson preparatory to a formal recitation of it. During the so-called supervised-study period

the business of the teacher may be *exactly* described. It may be that the teacher occupies the "furtive pulpit," and from that commanding position sees to it that no pupil is out of order *externally*. Or there may be a consistent type of activity, going from pupil to pupil rendering such assistance as he may need during that part of the hour which is designated supervised study. Other formal and stereotyped modes of activity might be mentioned. It is doubtful, however, if any real freedom in teaching can be developed by attempting to formalize supervised study. An attitude of mind, a disposition to experiment and to take full responsibility for the adventure, a realization of the possibilities of a stimulating intellectual game, and a fearless application of our modern educational philosophy and technic would tend to undercut didactic methods. Where there is freedom to experiment there is hope to improve.

Productive Activity.—The surest criterion of a productive class period, call it "supervised study," "socialized recitation," "co-operative learning," or what not, is the *work spirit*. That classroom exhibits waste and falls short under this criterion just to the extent that any member or members of that group, teacher included, become passive recipients or mere observers. *The most active kind of intellectual work may be silent reflection*. The hum of industry is a figure of speech. We should be guarded in our appraisal of activity. There is the noise of industry and also the noise of loose-running unproductive machines.

Busy working pupils have no time for the machinery of self-management. They may be brought up to a level of activity in which they would be too proud of

their capacity *to work in complete freedom* to care for the "laws" that imply distrust of themselves. As one chap expressed it: "It's folly to waste time in talking about what we ought to do instead of doing it." If in our maturer forms of associated life we need to recognize and appreciate alternate leaderships, then the high school should lay the foundation for intelligent action and initiate practices that will develop a genius for this high type of co-operation. It is not essential that the individual shall become expert in the line of his specialist.

All machinery of control, like the scaffolding in the building, should be used for a purpose beyond itself. The majesty of plan and precision appeals to the spectator. System is necessary; but it must be subordinated to the life which it is designed to serve. System must be installed underground and provision made for connecting with it, when we desire to replenish and rejuvenate life, by tapping the life-giving elements flowing through the system.

It is not difficult to find teachers who have so much discipline that they have no order at all. Pupils are quick to recognize and appreciate expert and artistic leadership. The classroom activities built upon the principles of an associated life will not be lacking in opportunities for demonstrated merit in the exercise of authority and guidance. There can be an enormous waste of time and energy in playing with the machinery and formalism of self-government. This criticism is not directed against the practice of having, for example, a pupil chairman; that procedure may prove highly beneficial under certain conditions. The objection is, rather, that any such external marks should be re-

garded as essential characteristics of a productive type of directing study.

Self-Governing Capacity of Pupils.—And yet, one must be hopelessly damned with a provincial academic mind, one must be a confirmed pessimist, or an uncompromising absolutist, if one fails to appreciate the possibilities in boys and girls for responsible self-guidance and initiative in carrying forward the legitimate work of the school. It is a strange philosophy supporting the belief and the practice that human beings may be subjected for a considerable time to arbitrary authority, almost to the point of blind acceptance and a Prussian docility, and then by some cataclysmic event be converted into self-governing, free-operating, responsible personalities.

A word from an optimistic humanist with a rare confidence in our ability to direct life toward an adequate measure of its possibility is wholesome in this connection. "In every child is the stuff of aristocracy. By that we mean the high potentiality of childhood for uprise or downslide, according to circumstance and opportunity. A child's mimetic powers are tuned to the pitch prevailing in whatever concert-room it happens to be an occupant of. Its creative genius moulds its own personality on the model of whatever performances happen to be staged there." Canon Barrett's story of an East London pageant is a confirmation of this healthy doctrine. Aided by a little science, much art, and a sympathetic evocation of the creative genius that is potent in every normal child, even the slum children demonstrated that they could "rise and awake to the call of a great heritage as if to the manner born." In the pageant it is related that a call came

that all under fourteen should report to the dressing-room. In it a voice from one of the youngsters was heard: "I can't come because I'm keeping order among a dozen kings and queens."

The success of high-school boys and girls in various extra-curricular activities, as well as in outside enterprises in the workaday world, should be a constant reminder of the high potentiality of youth. The upper limits of achievement in the central activities of the school might be extended almost immeasurably if something of the same dynamic qualities could be injected into them as are so frequently found in these other lines of action. Remarkable capacities for leadership, industry, initiative, and organization are exhibited in athletics, school publications, dramatic productions, and in numerous forms of industrial and commercial activities. Not infrequently these pupils who are making the most satisfactory progress in their studies are also engaged in some wage-earning occupation or in the extracurricular activities of the school.

It is an obvious fact, also, that the school fails to an alarming degree in mobilizing the full energy of the pupils. All sorts of misdirected energies are spent in dissipating, if not positively harmful, types of adolescent organizations. The school conceived as a social organization in its full significance should aim to provide abundant opportunity for the full and complete exercise of these powers which find expression in unprofitable channels outside of school hours. It may be possible to develop a *shared life* in the administration of the curriculum and in every vital aspect of procedure by which pupils may find increasing oppor-

tunity for the exercise of initiative, responsibility, and their virile powers. The looping up of enthusiasms for the legitimate functions of the school is an achievement of effective teaching and administration. When large numbers of boys and girls are found giving their full devotion to these essential matters, with a healthy integration of all secondary affairs, there is reason to believe that the school is making adequate provision for the care of youth.

The Social View-Point.—In a much deeper and a more vital sense it will be recognized that the social view-point raises the issue of democracy *vs.* anti-democracy. If the individual is to become a free-operating, responsible personality, he must have a voice in determining the ideals of work and a share in working them out. Only by making adequate provision for a shared life will it be possible to make the high school a vital social organization—a real practising ground of and for intelligent democracy.

The educator cannot set the pupil off and talk about his mental machinery, *except in abstracto*. Psychologizing precedes definite formulations. The boy is a geologizing, Latinizing, civicizing, and every other kind of an *izing* being when he is actually incorporating the spirit of the studies he is pursuing. There is no meaning attaching to the curriculum except in terms of the active agents, boys and girls at work—thinking, participating, reacting boys and girls. In fact, the history of every subject in the curriculum goes right back to the social basis; all subjects of the curriculum are a series of social problems, eminently practical in the wider sense. Pragmatism had been at work in education long before it became an *ism*. Wherever

thinking and *doing* have been emphasized in educational practice this conception has been illustrated.

The Implications of the School Conceived as a Social Organization.—The school, particularly the public high school (junior and senior), is best conceived as a social organization, a social-service agency soon to be operated in the interests of the entire body of the youth of the nation. The high controlling purpose of this *common* school is the building of thinking, socially minded, responsible individuals. The social principle should be recognized and made the dynamic in every phase of school life including the central activity and the dominant aim of every healthy, functioning school, namely, the intellectual and moral emphasis in the classroom. There status has been perpetuated; it must give way to a system of reacting partnerships. The habit, also, of mothering the curriculum with a pathetic devotion to the curriculum *mores* has made it difficult to break down the academic fetich, and to eradicate the blight of the specialist and the error of mere informational instruction. The academic mind is invaluable for the research type for truth.

The curriculum is no longer a sacred thing, a finality to be accepted blindly or a body of sanctions to be authoritatively administered. In spite of much that is haphazard and chaotic in our present practices, the curriculum is coming to be regarded as an opportunity for the exercise of discretion in choosing. Just now certain groups of subjects may be regarded as "prescribed temptations." No subject of the curriculum should be arbitrarily and dogmatically required any longer. This is not the occasion to go into an elaborate discussion of this thesis; the upshot of the matter in our discussion

is that the pupil and the curriculum should not be conceived as two separate ideas to be brought together by some temporary compromise or happy mechanical addition of these two, often obstinate, ideas. The new *cafeteria* method of handling the situation suggests two desperately significant factors: (1) a cafeteria scientifically constructed; (2) an individual educated in the intelligent exercise of choice. Gradually the pupil should be guided toward a *free* and ordered and responsible selection of courses. By the time the pupil enters upon the last two years of the secondary school he should be able to elect with a high degree of validity and value the studies he desires to pursue. He will soon be thrown on his own resources in a world in which he must take the responsibility for his new adventure. One clear aim of education is to assist each individual in becoming an excellent judge of his own development of democratic responsibilities.

In the daily negotiation of the curriculum the term *directing study* is used to describe a procedure in which the social principle is constantly applied. As conceived in this discussion the entire range of activities of the school should be developed within a programme of participating interests. Values exist only in terms of the active and vital self-expression of individuals. The pupil who fails to yield to the "temptations to excellence" in an adequate school denies himself the freedom that comes through work; he may, through some spurious relinquishment, fail utterly to incorporate the spirit of the school. Only as the individual enters with whole-hearted purposefulness into the activities and spirit of the institution, now conceived as an instrument in which power is to be exercised and

varied at the discretion of its active members, will it be possible to exemplify in him the full significance of the social ideal.

The second criterion of directing study in this thesis is the substitution of the social ideal for the exclusive knowledge ideal. This shift of emphasis is deemed essential in the development of the *work spirit*. These two principles have already been utilized in carrying this discussion thus far through a rather complex maze of destructive and constructive criticism. There would be no dissenting opinion from the general proposition of the desirability of reinstating the day when it is good form for a boy to admit that he takes an interest in thought, and also of initiating any sound procedure that will so broaden the basis of education that the term *worker* shall become a title of honor bestowed upon craftsmanship of mind and hand alike. Any procedure should be welcomed and indorsed, at least tentatively, that carries a hope of developing strong temptations to excellence and a disinterested love of mastery as opposed to an artificial interest "for the sake of the loaves and fishes."

Informational Instruction and Formalism.—If the knowledge ideal is held to be an end in itself and learning is carried on for the sake of learning or training for the sake of the state, the danger lies in regarding the individual as an instrument to be fashioned for ulterior ends. The indoctrination of ideas may supersede all conceptions of self-expression. The method of imparting information gains pre-eminence in this emphasis. Pupils are to be moulded, trained, and instructed. This theory may be developed so far as to establish a body of accepted information and tradi-

tion, a Kultur, which is conceived in the nature of capital to be loaned to the citizen in the making. Patriotic and efficient citizens can be developed through a national programme of education vigorously conducted by a body of trained teachers, and yet miss the essential matter in educating the individual for that freedom which comes through the full and complete release of his potentialities. The instructional ideal lends itself to rigid and formal methods. So much subject-matter is to be covered in a given period; the theory of imparting information promotes habits of orderly presentation. Attention is centred in the principles of informational instruction rather than in the problems of the learner. A recognition of the social principle would disturb the order and sequence, the plans and methods set forth in the didactic treatment of courses of instruction controlled by the instructional ideal.

A mechanical approach is illustrated in the five formal steps—preparation, presentation, comparison, generalization, application. The ardent disciple of Herbart regards these steps as a general method applicable to any subject in any stage of education. The attempt is made to harness the lesson in this elaborate form on the assumption that such is the order of the learner's progress in acquiring information or solving problems. For the Herbartian this cut-and-dried formula is applicable to all sorts of materials and conditions. Teachers have been trained to use the five steps, and model lessons have been devised to illustrate each step in logical sequence. Perhaps it is fair to say that teachers have found in this plan a means of gripping their work in a clearer manner than has

been possible by the more direct and flexible methods. From the learner's side, however, it seems to be a mechanical method, hardly applicable to the pursuit of the daily lesson.

In practice a disproportionate emphasis is given the first and second steps. Energy is usually exhausted before generalization and application are reached. Another defect, in general, is the failure to start with a problem which is real to the pupil and in which there is projected, at least, a way of thinking. Often the first steps are carried out in a formal, external, and wholly artificial manner in which the pupil is a passive agent merely following directions and accumulating information without purposive action.

In all such formal methods, as the five steps, the tendency is to assert the primacy of subject-matter. This, in fact, is the crux of the whole matter in placing the emphasis on the knowledge ideal. Informational instruction occupies the centre of attention. Too often real thinking becomes quite incidental to the acquisition of ready-made information.

By shifting the emphasis to the social principle, information is utilized in the promotion of thinking in terms of some problem or organizing principle. At all events, this is the projected ideal. Any pupil working forward in a co-operative challenge or on his individual topic is not required to wait on certain matters of presentation before gripping the significance of the general concept of the problem in hand, nor is any one held back in a formal march through four steps before making the step of application. It may be the last step which gives meaning to the whole challenge or topic, and, therefore, not a bad step to take first.

To require a class of some thirty pupils to advance in the order laid down in formal methods presupposes a regimental uniformity that does not exist. The working group discloses not a single method but many ways of making progress. One pupil, for example, glances hastily at some illustrative material in the explanation of a new topic (two or three pages in factoring) and goes forward in the task of solving exercises, gaining a sense of mastery by "doing the sums," referring to the introductory and explanatory matter as he finds use for it; another pupil agonizes with painstaking accuracy over the explanatory page, trying to understand the step of presentation before advancing to the vital situation. On the whole, the procedure of the former pupil is to be preferred. The introductory chapter of a book is not always written first.

In working up a comprehensive topic or challenge, requiring, say, two weeks or more, some general scheme, such as the five formal steps, may be employed to advantage. Of course the apprehension of a real problem should be included as well as some way (hypothesis) of thinking it through. This tentative and projected way of handling the problem set for solution is essential to any productive thinking. Some general scheme is no doubt valid and valuable. In any formulated account of developing thought there is or ought to be the occurrence of a problem or a puzzling situation *for the pupil.*

In these accounts "there is the sequence of (*i*) specific facts and events, (*ii*) ideas and reasonings, and (*iii*) application of their result to specific acts. In each case the movement is *inductive-deductive.*" * One

* Dewey, *How We Think*, p. 203.

criticism of formal methods is that the attempt seems to be to conceive the movement of thought as being either wholly inductive or deductive. The separation is unfortunate. The thought movement is one of integrating analysis and synthesis functionally bound up in a deeper unity than either alone suggests.

The quarrel we have with the disciples of Herbart lies in the apparent fact of their insistence upon a closed and authoritative method. It would seem, at times, that if one wants to know *what* to teach, *when* to teach it, and *how* to teach it, all one needs to do is to ask them and they are prepared to reveal it all in advance of the journey. The subject-matter is definitely laid out and the ready-made methods can be furnished. *The indolent formalist is strongly tempted to accept all these accredited forms and to administer his work under the control of arbitrary standards to the utter neglect of that continuous moral analysis which is imperative in the application of the social principle to educational procedures.*

Life situations do not come to us gummed and labelled and arranged in that logical order presupposed in the five *formal* steps. A young man selecting his bride would encounter serious difficulties if he proceeded in the order of *preparation*, *presentation*, *comparison*, *generalization*, *application*. He would probably break down somewhere in the third step—the step, by the way, which marks the degree of progress in this method, as a rule, in the schoolroom.

The power to generalize experience and the capacity to make application in any vital sense are sadly neglected in our pedagogical practices. Of *preparation* there is no end—reviews, ambushing the facts, much

ado in getting ready to do something. Of *presentation* we have an enormous activity and display—explanations, diagrams, pictures, rules, stereopticons, and moving pictures, all of which may be used to promote absorption of facts or as a splendid aid in the development of clear and economical thinking.

The time devoted to *comparison*, that is, the time actually devoted to an examination of data for the explicit purpose of drawing independent conclusions, is scant indeed. If, however, the full significance of all five steps could be attained, there would still be much to give us pause. Any system or methodology that becomes rigid and inflexible deletes automatically the responsibility for keeping up a continuous moral analysis.

Learning Practical Things Out of School.—In learning practical matters there is no elaborate formalism superimposed in the nature of indirect and apparently unrelated steps. Means and ends are organically integrated in a way that tends to obliterate distinctions between academic or theoretical propositions and useful objectives. It is not, however, a valid argument to maintain the thesis that all educational practices can be directly related to the immediately useful. One must learn to fiddle before playing in the orchestra. The difficulty in dealing with large areas of education lies in the fact that possible remote values must be considered. In other words, it is futile to urge that all aspects of education can be reduced to the directly practical or vocational basis.

Some work of the school is definitely instrumental; dividends are deferred. Practice, also, in the manipulation of what may be called tools of training is essen-

tial. The theory of education as preparation intrudes itself constantly. In spite of this tendency, however, it is possible to introduce the element of realness even in those abstract categories which occupy the centre of attention in so many courses of instruction. Simply because remote interests are involved is no logical reason for depreciating the value of any course or part of it. Hence no illusion is entertained about making a curriculum in which just practical "projects" will appear. An illustration in learning some every-day problem is suggested only for purposes of departure.

If the boy is confronted with the mastery of the automobile (mastery in the sense of being able to use the machine and to know what to do in the emergencies that arise in its use), the method of learning is direct and constantly tied up with the step of application. There is no disposition to spend several lessons on the origin and development of wheels and vehicles and applications of power. The step of preparation is a short one indeed for the boy keen to try his hand at the wheel. There is no time-consuming programme of explanation of vital parts, comparison of machines, and the slow and steady process of building the automobile concept prior to a real experience in driving the machine.

The academic way postpones the interesting step (application) to a time so far ahead that the boy would lose interest in the course. The learning of the automobile in the practical way appeals to the learner because a sense of mastery is quickly attained. There is something doing, as we say, immediately, and the results of one's efforts are strikingly revealed at every stage in the learning process.

All these other fine "lessons" may be looped up in a genuine realization after gripping the significance of a real boy *plus* a real automobile experience. Integrated with that item of significance an extended course of instruction may be built around the automobile, every "lesson" of which might be so conducted as to arouse curiosity and stimulate interest. All that may be desired in the historic development of vehicles and in the mathematical desiderata utilized in constructing the engines and models, etc., could be related to a going concern.

One may indulge the fancy that studies in the school might be modified in the direction suggested in this somewhat idealized automobile experience. The arbitrary separation between abstract categories and concrete relations is disappearing. Perhaps the terminology itself is unfortunate. The essential matter is to grip the significance and meaning of experience in the solution of vital problems.

The general movement to indicate the practical significance of many courses of instruction, formerly pursued for alleged disciplinary ends, is a concession to modern pragmatism. Every effort is exerted to make vital connections with our modern life in the study of Latin, ancient history, botany, algebra, chemistry, geometry, etc. The hope of starting in the quest for truth or mastery with some problem dated in the present is expressed in all sorts of attempts to orient the pupil to the values of the practical studies laid out in the curriculum.

Much has been proposed in the desire to start the study of history with problems of immediate interest and to work back into the antecedents by finding how this and that problem of the present developed. The

question turns upon the chronological order of events. But whether some radical innovation is introduced or the old method is pursued, the interesting fact is that in either case there is a deliberate effort being made to show the relation of the past to our present and future problems.

In the study of Latin the pupil is constantly reminded of the relation of his work to his vernacular. It would be exceedingly difficult to relate all the work of the school to our immediate life. And, furthermore, it is a fundamental fallacy to assume that pupils are not interested or, better, that they may not become intensely interested in things remote from present-day needs or in things abstract. By rewarding achievement and effort in learning or mastering forms or exercises that could have no conceivable significance beyond the mere sense of accomplishment, many pupils are induced to respond with abounding enthusiasm. This is not an argument for the retention of useless material in the curriculum, not stopping here to define what is useless—a very difficult job, by the way.

Evils of Uniformity and Remedies.—The knowledge ideal and mechanical methods have developed the lock-step in education. Progressive educators are seeking ways of obviating a system characterized by a practice of in-together, on-together, all-together, out-together. The effect of uniformity is frequently expressed in the attempt to reduce all members of the class to some level of group average or group mediocrity. The evils of the system are everywhere coming to be recognized. The remedies, for the most part, fail to take into account the ideals which produce the system itself.

The proposition to bring together the supernormal pupils of a given grade or mental age is not only an impractical administrative undertaking, but undesirable from the *One-from-Many* view-point of our social organization, interpreted in terms of alternate leaderships and interdependent relationships. It is a proposition, too, that seems to allege that man *is* already, instead of a sturdy facing of the doctrine that "Man *is* not, until he *becomes*." Moreover, in all the proposed schemes for assembling pupils of alleged homogeneous ability, the errors of the instructional ideal may be perpetuated. An accelerant supernormal section may be exposed swiftly to all the errors in the doctrine and practices which are vigorously condemned.

It will be readily granted that some modification of practice which aims to overcome the disadvantages of uniformity is desirable. Our problem in this discussion, it will be remembered, is that of meeting more adequately the exigent demands of the modern school, as it is at present constituted, than is possible under the recitation system. No doubt a more adequate and scientific practice of placement of pupils will be developed than that which now obtains. But to-day teachers are confronted with the task of educating boys and girls as they are assigned under the prevailing sanctions. It is not at all improbable that a deeper scientific study of the problem of placement may not bring together pupils of greater range in chronological ages than we now find. In non-sequential courses there may be economies in the congregation of pupils of comparatively marked differences in experience and age.

At all events, whatever programme is adopted in ascertaining the opportune time for some thirty *potential* geometricians, political scientists, poets, et cetera, to congregate for the study of geometry, civics, "The Village Blacksmith," or almost any other study within the approximate range of these thirty candidates, a tremendous gain will be made if it is perceived clearly that thirty individuals are there. Thirty individuals are there in no sense equal in any immediate finite attainment, and, what is more to the point, they should not be regarded as so many units to be rounded out toward any conceivable sort of uniformity. Really, under the procedure advocated in this interpretation of directing study every open avenue of opportunity should be utilized for greater and more penetrating differences in this group of thirty individuals as they progress in the course.

The New School.—If this challenge is accepted, then it follows that the set-lesson (uniform) assignment, the minimum-essential-*content* doctrine, and all the progeny of these ideas must go. The lesson-hearing school must go. The recitation, belonging to an age when books were few and schools were established to *impart* knowledge and to *test* the student's capacity to *absorb* and *store up* unrelated information, it, too, must go. Collective or mass teaching which aims at a mythical average pupil, defended because it is easy or because provision for individuality would be exceedingly difficult to realize, that too must surely go.

That school to be a good school in the immediate future will undertake to develop in its pupils an ever-growing personal efficiency in using stored-up subject-matter to approach new and unexpected situations

and to solve new problems. Pupils will be dealt with as individuals; no pupil will be held back because others are developing more slowly than he, and no one will be pushed forward beyond his capacity merely because others are more rapid in developing power. The entire school procedure will be flexible, not rigid; it will encourage individuality, self-mastery, initiative, and personal responsibility.

Set lessons, definitely prescribing the upper limit of accomplishment of the good pupil, will rarely be given. The teacher will become the director of activities; his assignments, often arrived at in consultation with the class, determine the direction in which the group shall work, but do not prescribe the amount of accomplishment in that general direction which each pupil must, or may, make.

Pupils who excel in accomplishment will be rewarded by increased opportunities and responsibilities; frequently they will be promoted for a time to assist the teacher in directing the activities of the class.

Home study will usually not be sharply distinguished from classroom activities; in general the class hour will be spent in working ahead, not in reviewing, summarizing, or reciting upon subject-matter which has been studied out of school. Home work will be ordinarily of the nature of *unfinished business;* that is, it will complete, supplement, expand, and verify what has been begun under the teacher's guidance within the class group.

This practice of directing study will tend, it is believed, to develop in each pupil the most effective habits of attention, concentration, and achievement which he is capable of acquiring; it will develop his

initiative because he must begin his undertaking without depending upon the initiative of another for his ideas or for his impulse to start; the teacher, an expert in education, will be in general much better qualified than a parent to judge exactly what assistance may most profitably be given a pupil in the study of his lessons. The school will aim to direct its pupils through subject-matter to power. The curriculum and the expert activities of its teachers will be regarded as means to an end; they will be conceived as tools for the fashioning of self-active, responsible young people. The endeavor will be to determine by practical application the best possible choice of subject-matter and the most serviceable ways of teaching and of school administration to further the development of its pupils. Nothing will be retained merely because it is traditional; nothing will be discarded merely because it is unfashionable; an earnest attempt will be made to be reasonably conservative and to keep free from educational fads. There will be no disposition to conduct experimentation without regard to the immediate welfare of the pupils involved.

If the choice is forced between adventure and efficiency there can be no doubt in the defense of this thesis as to which is to be preferred. If either must be sacrificed, it will be the latter. Yet one may argue very properly that the eternal problem of our democracy is "Can Democracy be Organized?" without destroying personal initiative and deleting the spirit of adventure.

Every Class a Prospecting Party.—We have suggested the colorful figure that our class might be organized as a prospecting party with the leadership of a

teacher as consulting expert. All members of the group are to become prospectors. No one is to be an everlasting minor, an unthinking follower. The canyon up which the whole party will enter to-day will ordinarily be sign-posted by the teacher; although in this a fine sense of directing energy will obviate dogmatism and officiousness. In a vital way provision will be made for mutuality in choosing at the "fork of the road." The party will not have any camp-followers.

That Emersonian quality of self-respect will be cultivated in every person in this adventure. The director of activities, the new teacher, will no doubt be familiar with the possibilities for discovery of values up these canyons. There will be something to do beyond an examination of the débris and the *tailings* left by previous prospectors. Each individual will be stimulated and guided in the adventure in a manner that will enable him to survey and dig to some extent on his own account. No one will be allowed to develop by himself at the hazard of indolence.

All are true sportsmen and equal in that respect. Each may work in the hope of bringing to the discussion about the camp-fire some personal experience gained in the adventure, some nugget discovered by himself, some promising lead for further investigation. In the discussion each will have an opportunity to contribute something, no matter how insignificant in itself, that no one else has discovered. The basis is laid here for the cultivation of a genuine self-respect.

There is a possible escape from a flat uniformity. No healthy boy enjoys doing his work by proxy. He wants to get into the game on his level. Listening in a situation in which there is a chance for the *cross-*

fertilization of ideas elevates and dignifies the procedure by recognizing the factors employed in stimulating and challenging conversation. The importance of making provision for originality, even in so small a measure as making it possible for any pupil to contribute a salient brute fact to the discussion not thought of by any other member of the group, can hardly be overestimated.

A Moral Basis of Methodology.—In general, the teacher is expected to know what is best for his pupils. The disposition, however, to become a kind of brother's keeper in the processes of control and direction is often tacitly accepted and encouraged. It is a common practice to stand the other fellows up and shoot at them with our benevolence. A certain form of Neo-Puritanism promotes the view that *we* know what is needed for the other fellow. Hence "to hold the class" is regarded as a fundamental qualification of the schoolmaster. The external form of discipline is made the basic tenet in the doctrine that "Order is heaven's first law."

Carried to its logical conclusion state absolutism denies the worth of the individual and refuses to concern itself with the rights and obligations of the individual as a free agent. In the extreme form this absolutism undertakes to set the appointed lesson, the appointed hour, the appointed method in advance of the journey. The alternative is not idle freedom or any species of determined ignorance or the anarchy of tolerance. We have already pointed out the path to *freedom in work*. The ability of a class *to hold itself* may be a goal worth striving for. Yet, our position is rather a deliberate effort to develop the self-active, co-operative,

responsible individual in a shared leadership in which the teacher is able to direct energy to fruitful ends. The programme is not laid down with precision.

The subject-matter of morals is concerned with the "deed-to-be-done." When confronted with the eternal pragmatic question "What am I to do next?" the thing to be done is never an exact copy of what has been done. All that has been done must be translated from the indicative into the imperative in facing a moral situation.

The practice of morality has its locus in choice. "What am I to do next?" in this and that situation in meeting the endless panorama of events in teaching involves the hazard of adventure. The only escape from this responsibility is to accept a finished absolutism and to superimpose a kind of intellectual goose-step without regard to the effect upon those for whom the prescription is made.

A curious inversion of the notion of freedom may be wrought through a willing acceptance of obedience and discipline. A whole nation may be indoctrinated through education with a sense of its own superiority and the superior qualities of its own citizens. The ideal of organization may be extended and refined until the majesty of plan and precision becomes a fetich. The psychology of unthinking obedience and of loyalty to the ideal of organization is both primitive and dangerous. All this follows upon the acceptance of society as a machine existing for some material purpose. In one direction the emphasis in education is to discover what the individual is good for and *then* to train him for some part in the machine.

In direct antithesis to this mechanical theory of edu-

cation we have the conception of society as a living thing. The individual must discover the purpose of his own life in an association of human beings. Every human being in the conception of society as a living thing must be free to become an excellent judge of his own developing powers and his own opportunities. This view is the democratic theory of society.

One may store up vast quantities of ancient lore and have at command the *how*, the *when*, and the *why* and the *that* of every previous circumstance and yet be as ignorant as Balaam's proverbial ass before the challenge "*What am I to do next?*" in a human situation. The last great adventure may be charted and every current and shift of wind annotated on the margin and in foot-note, and yet leave one stuck in the mire of irresolution unless there is a moral optimism, a moral character that enables one to sail out in changing, uncharted seas of human conduct, or do the simplest next thing, namely, to choose to eat a biscuit or to make the next move in the game of checkers.

The next step is not taken by reproducing a copy of the previous motion. One may keep all the laws, commit no crimes, and yet the heroic deed or the chivalric act may never occur.

The practising ground for morality is developed, not by exact formulation, not by exact rules of the past applied as copy, but by taking the moral risk in the adventure that calls for choice and decision. It is for this reason that devices for teaching are rarely negotiable. It is for this reason that "methods" of teaching have been held in contempt by scholarly men. The adaptation of devices is to be encouraged. Whenever the method is *reconstructed* in terms of one's own prob-

lems and experience, there is valid ground for the attempt to communicate procedures to others.

The ethics of methodology with a clear field ahead for the practice of morality must inevitably be contained in that chapter in any book on "How to Teach" *just after the last chapter in the book.* That chapter must be constantly rewritten and never appear in print. There can be no vital, moral situation in any classroom unless that interesting chapter is being constantly written in the flux and interplay of human forces.

This view frankly subordinates the intellectualistic and national principles and ideals to the moral and social principles and ideals. Conscience is above science. The artist is above the artisan. Character is the result of social interaction; character is built in the stream of life.

The new declaration is that my teaching *is* your learning viewed from my angle, and your learning *is* my teaching viewed from your angle. Democratic ideals call for the application of this interacting principle. The business is not a *transaction*, a mechanical addition of disparate actions, but an *interaction.*

Heretofore the professor lectured, taught, imparted information; the student listened, learned, reacted (perhaps). Neither assumed a dynamic responsibility. If the student failed, an assortment of reasons (alibis) was at hand. Now, under the democratic movement, the teacher may not dismiss the pupil from his mind. The requirement is to locate responsibility by examining the facts and by prescribing the medicine and by changing the treatment, if need be.

The old pedagogy, constructed along arbitrary and mechanical lines, afforded abundant opportunity for

the indolent formalist to execute all sorts of metaphysical flank movements, the classical example of which is the famous trick executed by Plato on the Sophists when the question of reality was removed to the celestial shoe, the visible shoe being only a copy of that ethereal invention. In other words, it has always been easy for the schoolmaster to explain the failures of his students. Now with the more intimate and immediate types of direction, control, checking, and appraising in teaching contemplated in an interpretation of ethics from the point of view of the consumer, rather than the producer, it is becoming apparent that pupils and teacher shall come to terms with each other on the basis of mutuality.

In passing from the aristocratic temper over to a democratic attitude the law is no longer regarded as the schoolmaster. Under the influence of the old order the practice was to have *first* a course in the law and *then* a course in Christianity. The demand which St. Paul made was that man shall have the latter straightaway. The law can hardly serve as a temporary expedient. The alleged secret is out. The American youngster in these times is not inclined to regard his teacher as the law. The moral effect of pretending to possess a virtue or quality as a temporary expedient is obvious.

The survival of certain forms of Neo-Puritanism is a mark of the aristocratic temper. What is good for "others" raises an interesting question. Consensus of opinion and majority decision in a democracy can usually be relied upon as a means of securing justice and freedom. There is, however, a tendency to fall back upon authoritative statement and to superpose

prescriptive methods. In autocratic forms of social organization the ruling class exercises the right to dictate the terms upon which the masses shall live. In building the self-active, responsible, socially minded personality in a democratic society the school must perform a unique function—a function radically different from that which is deemed adequate and entirely satisfactory in anti-democratic states.

The new ethical humanism can be translated into every-day practice by employing the social principle. The knowledge ideal, intellectualism, will not be disregarded. No plea is being set up for ignorance. The entire programme is to be modified by shifting the emphasis from the primacy of information to the primacy of boys and girls as reacting agents.

It is not enough to remove "impediments from without." The old absolutism parades under a new guise if "impediments from within" are harbored. If the practising ground for morality includes as one of its main ingredients the element of choice at the fork of the road, it is exceedingly difficult to negotiate a methodology conceived in terms of ready-made devices and closed categories. The inevitable tendency to reduce "methods" to a formal and mechanical routine deletes the practice of choosing freely. It is the bold, energetic, affirmative, and self-assertive will that ventures with a moral optimism into new and complex situations.

In the field of experimentation log-books are more important than plan-books and guides. In making honest entries in the former we may develop a keen sense of self-criticism and refine our powers of judgment.

There is no break in this emphasis with modern science; in fact, modern science is concerned at every turn with the same fundamental query, namely, "What am I to do next?" in *this* and *that* situation. The ability to move forward in the experimental method is a sign of moral stamina. There is no point in the idle reaction that any reference to the moral fibre is a mark of sentimentalism. Experimental science, surely the experimental method, furnishes an excellent field for the exercise of morality.

The plea is not for educational self-determination. It is not a plea for the low mythology of equality in which American politics weltered for well-nigh a century. It may be regarded as a new programme in which individualism is guaranteed (even to children) and also a clear path toward a full recognition and appreciation of alternate leaderships and the genius for co-operation, not by schemes of regimental uniformity, not by swallowing up the individual in a socialistic composite self, but rather the urge of a new sense of moral responsibility and a boundless respect for each and all *in* a democracy.

This means an end of status and a frank recognition of the evocative and creative powers of every normally constituted person. To accomplish this end the teacher should recognize the pupil's "Right to be Wrong." There will be less superimposition of accredited knowledge as erudition. There will be time to consider the position and the point of view of the learner. He may be of the firm conviction that the earth is not spherical. It is not wise to ask him to repeat a conventional ritual about it merely for the sake of conformity. If there arises honest debate, the hope of education is being realized.

The superstructure of systematization, all that is lugged in under the ægis of national efficiency, may operate against the full-orbed development of the individual. This happens when life is sacrificed to the majesty of plan and precision.

The objective set forth in this analysis is a revealing of the ideals of America redirected to reason and self-realization through invigorating programmes of self-direction under team-play. There is nothing alarming in this proposition when we hitch up our trusteeship with Hampden, Burke, Washington, and Lincoln.

The Prussian system of education with its ugly mechanism, nationalism, exclusive intellectualism, and politicism has been tried and found wanting. It failed to produce the morally self-directing, self-lawgiving personality. We in America were not far-seeing in imitating Prussian methodology.

The social institutions of cricket and football offer a suggestion: "The captain, ah! what a responsibility —firmness, gentleness, skill, and I know not what other rare qualities—almost equal to those of the head-master." This is a recognition of the social-moral principle which is capable of being incorporated into our classroom procedure. It would mean no longer the law (drill and preparation) and *then* a course in civic responsibility (application). The boys and girls should be trained in responsibility for choosing. It means that originality, creativeness, initiative, shall be growing qualities *now* in every pupil to the full measure of his possibility. Each will be given a fair opportunity to develop his own idiomatic personality. The individual is not to be hammered into a certain predetermined pattern. In his obedience to rightly con-

stituted authority he is to become intelligent. External discipline is directed toward the goal of a "must be" from within. In all this the individual counts and has value in a social-moral order.

The old assumptions that some are to be everlasting minors, to be kept by their brothers, to be excluded somehow from the intellectual, material, and spiritual resources of the nation—all that is a recrudescence of the aristocratic order. The time to begin this new education is this very hour. We have been influenced by the old theology long enough; we need a new theology. This world was conceived as a preparation for another. That led to the gospel of resignation; man escaped the social problems of the day. It's no use to prolong the argument. Education must find a new dynamic in life *here* and *now* and on-going. Plan or method is inherent in the process. It is ours to unify and coordinate our ideals out of a serious, joyous striving under the philosophy of self-expression, or self-effectuation wherein the "*discharge of life*" is the mainspring and urge.

He who would teach by pattern methods, thinking he may on that account be scientific, misses both life and the scientific temper, and besides fails to afford a deliberate practising ground for morality. The teacher who has found a formula, a recipe by which to operate on little Billy who plays truant next October has ignominiously failed—not only in handling Billy (he has protective coloring), but he has lost the trail utterly in his own moral growth.

Plato long since urged it: "In all language, customs, mathematics, etc., if you would really do it you must rub the phenomena of the individual psyche with the

social life, as you would rub two sticks together (a ruler of rubber and a flannel rag) if you would produce the flash of light."

There is no "spiritual explosion" when status reigns —teacher-mind off there on a pedestal (furtive pulpit) and pupil-mind off there (in the mourner's pew). The belt is off the human generator. The generator is out of repair or it needs oil. The social principle is the clutch which throws the belt on the human generator. The course of study which lays down in specific terms in January, 1922, what is to be done in December, 1923, is also an educational culprit. The set lesson (uniform) with a just-"set"-in-your-seat-and-study—all this from the yesterdays will not be adequate for to-morrow. It all tends to place a veto on our to-morrows. And in just so far as that happens by so much is the ground cut away for the practice of originality and choice at the fork of the road; hence, no dynamic exists for morality. The cut-and-dried plan-book is conceived out of a Prussian intellectualism. It is based upon indoctrination of ideals and facts, *as such.*

Nobody in that scheme of education wants a self-active metabolism. In that system the aim is to go about scraping together little dabs of information on a purely intellectual quest. Man is more than such a philosophy would indicate. Man is primarily a willing and feeling (appreciating), as well as an intellectual, animal. He, in America, is a *determined* willing creator.

It is one thing to make discipline serve the ends of education; it is an entirely different thing to make education serve the ends of a disciplined manhood. Nothing short of instant and willing obedience to authority

can be accepted in the adventure of creating the gentleman in a democracy. And yet, that authority which is imperative in building the responsible individual rests upon a discipline that serves the ends of democratic education. The goal is self-discipline—a *must-be* from within.

CHAPTER VII

INITIATIVE AND AUTHORITY

The Nature of Freedom.—If we start in the quest of effective freedom by prospecting up the canyon signposted "*Liberty is an Achievement, not a Donation,*" then it will be evident that it is the artist who has *freedom* to paint the picture, the athlete to run the race, the judge to render a decision in law, the scholar to express a judgment in his chosen field, the locomotive engineer to turn on the power, the surgeon to perform the operation, etc. In brief, any real freedom, in any direction, must be earned. The price of self-discipline must be paid by all alike. The true liberty man possesses is the liberty he has worked up to. The "free" execution of the pianist is the goal toward which this chapter is pointed.

A severe doctrine, indeed! Yet actually "Man creates himself by his own activity," as Kant phrased it. Each individual is a candidate for personality. "Man *is* not, until he *becomes*." Here is a sure foundation upon which to build the free-operating, self-active, responsible person. The process of candidating, of becoming, may be carried on indefinitely.

The "educated man" is an unfortunate way of expressing it. The difficulty lies in the ending, *ed*—a dim survival of the product of the finishing-school. There are, too, the "educated failures"—those who accumulate a sufficient number of marks, indicative of inca-

pacity, to be recommended for the final honors of the school. Half-learning, a total failure to incorporate the spirit of the subject, duck-backing an education are familiar forms of indictment of our schooling. Any definition of education is inadequate that fails to emphasize a growing personality and a "continuous reconstruction of experience."

Freedom is never a passive right; it is a quality of actual achieving. The "free" man in his particular mode of excellence or skill does not lay by a store of energy, called his liberty, which he may draw upon at will. The exponents of original endowment seem to imply, now and again, that all a "genius" needs to do is to draw on a reservoir of stored-up energy, smite some rock as a Moses of old, and the life-giving elements will issue forth.

By ceasing to energize in profession or work, by permitting effort-making capacity to cease or run at low ebb, one loses whatever freedom one has achieved.

From Irrational Intolerance to the Anarchy of Tolerance.—About four hundred years ago, when the modern democrat began to grow up, irrational authority could no longer be secure in its old sanctions. The story of the struggle for freedom of thought has been both thrilling and pathetic. When the old securities began to disintegrate, there appeared a new menace to progress. Equality of status of all "honest" opinions *with* judgments based upon rational sanctions was substituted for the aristocracy of opinion and authoritative mandates. We are still living in an age in which the sanctity of opinions is as jealously protected as that of property. Freedom of thought is safe only when it is realized that it entails a desperate responsibility to

think, and to think not in terms of a superficial *rationalizing*, but in terms of our modern scientific and creative modes.

Our *intolerable modern tolerance* is working havoc in no phase of life to-day with such tragic consequences as in education in its wider significance. Some fanatic cult or group of queer folk is perfectly secure in our democratic America in holding mediæval opinions and in "educating" its children in the doctrines of organizations wholly out of touch and sympathy with twentieth-century science and morality. Such a cult is protected by the state in teaching that the earth is flat, that evolution is the work of his Satanic Majesty, or that loyalty to the ideals of the nation is only a cunning scheme of the politician. And just because such opinions are thought to be "honest" opinions their sanctity is not molested.

A whole nation, a mighty potential people, may be corrupted to the very roots by a false attitude or ideal under the protection of "honest" opinions. Even a democracy may be seduced by some insidious propaganda of the *über-alles* theory, such as America over all, and the schools may become indoctrinated with that ideal under the enthusiastic leadership of undoubted patriots spreading their gospel, thrilled with perfectly "honest" opinions. The deeper loyalties to the commonwealth and to humanity may not be secured by such methods at all.

The day of the old repressive measures under irrational sanctions are rapidly passing with respect to external forms of deformation and wrongs. There remain all those "impediments from within" which hinder the *free* development of the child and which

make impossible the full release of every wholesome potentiality. The age of fourteen, a remnant of an old theological dogma of church confirmation, is still regarded by the great majority of "intelligent" Americans as the proper leaving age in school legislation. Crystallization of educational public opinion on this leaving age has no doubt been stressfully augmented by extensive imitation of German ideals and practices. At fourteen the child in Germany in the Volksschulen was shunted into vocational schools. "Statesmen" are pathetically indifferent to the cry of the adolescent in this twentieth century. The "right" of parents to take the child out of school at fourteen years of age is blindly protected. Only about 30 per cent of the youth of the nation are in our high schools; the level of American citizenship is barely above the 6th grade. It is not enough to point with pride or to view with alarm the development of the high school. Our neglect of adolescence will be looked back upon as the consummate instance of the communal crimes for which we shall be despised. The argument for full-time education for the youth of the nation is overwhelming, yet we in America allow boys and girls to sally forth unprotected and uninstructed into the world just when that all-important sex instinct is beginning to obtrude itself upon consciousness. They become fagged juvenile workers in our machine age and are rapidly exposed to all manner of debasing influences. A beggarly eight hours a week in continuation schools is a shameful beginning. The imperative need of full-time education for all the youth of the nation up through the high school, or at least until eighteen years of age, is too obvious for elaboration.

Here is the major difficulty blocking the road to real progress in the emancipation of the child and the full release of creative power:

> Opinions are sacred and inviolable individual rights—every folly and patent idiocy can claim the same "respect" as the most stringent rational conclusion. *If any one should venture to raise a doubt about the right to inflict deliberate and irremediable deformation on the defenseless mind of a child, to instil irrational prejudices, to teach falsehoods to cripple effectually and completely his rational powers, to poison the sources of judgment, to rob him of his human heritage*—such a suggestion [any interference in the *right* of a parent or cult to inflict deliberate deformation on the defenseless mind of a child] would raise a storm of righteous indignation, the cry would go up from the successors of the Inquisitors and High Commissioners that *the sacred rights of conscience are being challenged*, that it sought to bring back the days of persecution and intolerance, that liberty, freedom of teaching, the most indefeasible rights of the subject are being menaced and violated. It would be as scandalous to dispute that the parent has an absolute right to strangle a child's mind as it would formerly have been to dispute his right to strangle his body. All sincere opinions are "honest." Wrong must not be tolerated, but every opinion has a sacred right to be tolerated.*

A Projected Investigation into the Life Basis of Human Behavior.—Would that some great scientific humanist might be endowed with adequate funds to conduct a real experiment along the following lines! ($50,000 would be little enough: this is no job for the amateur student writing an undergraduate thesis). Here is the problem: Let him give the modern "intelligence" tests in September to some 100 children in the 2d or 9th grade, say; file the results in a secure pigeonhole and leave them there until the end of the

* Briffault, Robert, *The Making of Humanity*, p. 319.

school year. These tests will constitute *A* in the investigation. Neither this scientific humanist nor the teachers are to know the results of these tests until one year has elapsed.

At the close of the year let the marks of the teachers be collected and filed in another secure pigeonhole. These marks will constitute *B* in the investigation.

Now, upon giving the *A* tests, let our scientific humanist give full time (at a salary of about $10,000) with expert assistants—a physician, an histologist, a psychiatrist, a social psychologist, an educational biologist—and make a study of these kiddies in their home contacts and in such other non-school relations as may reveal individual variations in the broader training of life. These results will constitute *C* in the investigation. A "standard" will be constructed. Our scientific humanist will cunningly contrive to find out what the intellectual interests of the child's parents, relatives, and immediate friends are. He will go into the homes to detect whether the child has a "dad" or a father; whether or not the parents are good teachers of lessons assigned for home work by the school; whether the child is told at the common board that he is to be seen and not heard; whether there is the old irrational intolerance with the little child, general indulgence, or a fine sense of effective freedom; whether the measures are repressive or rationally directed to effective self-expression, etc. He will discover what books and periodicals and other educative mental food are in the home. He will disclose those character-making forces in the intimate relations between father and son in the dressing-room in the morning, about the hearthstone in the evening,

in the hike and the game, in the work they may do co-operatively or by dictatorial authority. He will disclose the opportunities and responsibilities of the child in the many-sided activities of the home and other institutions out of school. He will discover what the incentives are in music and in all forms of artistic expression impinging on the life of the growing youngster. The sturdy parent, poor in worldly goods, may be instituting his fledgling into his social heritage in a marvellous way, while an aristocratic neighbor may be indulging his progeny. These are only hints of the year's work to be done under *C* in the investigation. Perhaps many years will be required for adequate mastery of the problem. An endless complexity of backgrounds must be considered.

Then let the experts open *A* and *B* and make their quartile distributions and establish their correlations. The real task is still untouched. Our scientific humanist brings in his data under *C*. Now let him make a careful comparison between *A* and *C* and again between *B* and *C*. *It may be that he will find that the dice are loaded in A and B. In other words, may it not be that the conditions and circumstances which produce A likewise produce B? And it may be that those conditions and circumstances lie wholly within the remediable fields of human behavior.* It may be that the factor of original structure plays a minor rôle in all this. That is to say, it may be that nearly all the successes and difficulties of children in school will be discovered to be conditioned mainly by all this wealth or poverty of backgrounds under *C*. The suggestion here for the educator is to study procedure values and to cultivate all those influences that tend to develop creativeness

and initiative. It may be that some children are actually being dwarfed by the methods of education. It may be that in more cases than we imagine the father or mother or an interested outsider is the real guide and director of the child's creative genius and that the formalism of the school fails to smother it out. If the full effect of *C* could be realized it might serve to enforce the hypothesis that the pupil shall become the educative unit and not the class group. Moreover, it may turn out that the prophecy based upon *A* and *B* cannot be of any value to the teacher in the light of *C*. A stressful change in procedure, it has been demonstrated, will disturb, if not invalidate, the correlation between *A* and *B*. If the results in *A* are revealed in advance of the journey, human nature being what it is, there is great danger of being obtuse to the data under *C*, and also utterly blind to the possibilities of experimental teaching.

All these complex factors under *C* constitute a programme for a study of the life basis of human activity and achievement. Even the theory of instinct, upon which an enormous amount of predication has been made, must now be regarded as an hypothesis. The scientist takes into account the personal equation. He, if he works without bias, if he guards the habit of robing his opinions in the livery of science, will tie up his own prejudices in a bundle and label it as one set of facts that he must consider in the creative or scientific mode of thinking. The difficulty and the danger of basing a prophecy on *A* above would seem to lie in a readiness to believe that original nature has doomed the child to one level of "intelligence" or another.

The evolutionary products of the race continue to

be transmitted, and the old argument as to whether heredity or environment determines more markedly the individual is carried on with a high degree of enthusiasm by both sides of the controversy. Humanity, as a whole, is the organism which transmits the products of our human evolution. These evolutionary products are in the nature of language, institutions, customs, beliefs, methods, technics, habits, attitudes, and a thousand ramifications of our social organization. These products are not derived from parents. They contribute next to nothing in this social heredity. Every man is born a wild little animal, wholly uncivilized, susceptible of becoming a howling savage, whether he be a man of the 5th, 15th, or 20th century. It is the human world conceived as an organism, a scientific fact, "which makes him what he is and determines to what stage of evolution he shall belong." The analogy of physiological heredity will hardly hold in our social heredity.

Rights and Duties.—In the realm of political and civil rights, guaranteed by statute or constitution and affirmed by court decision, we have an apparent exception to our general thesis. A man comes into his majority and, through no responsible achievement of his own, is given the right to vote. This right or privilege has not been earned. With the exercise of such a right, there is coming now to be felt a keen sense of responsibility. One of the major functions of the secondary school is to bring all youth up to a fine sense of duty in the exercise of these guaranteed rights. The right to vote implies the duty to vote intelligently; the right to legislate carries with it the obligation to legislate justly.

The right to life should be guaranteed every human

being. While urging a rigorous doctrine of individual responsibility, it must be recognized that a man thrown overboard in mid-ocean has no *freedom* to swim to shore. The hurdles must not be insuperable. This is far from arguing that no difficulties should be encountered. Yet, a realizable opportunity to become a self-active, responsible, free-operating personality is absolutely essential in our form of social organization. One of our real problems is the building of a social mind that will be able to comprehend and appreciate the almost unimaginable resources of human potentiality and the vast, untouched reservoirs of possibility of the human spirit. Under the stimulus of our social enthusiasm a deliberate programme could now be projected which would employ available and potential scientific resources in the building of the effective individual—the man who could think, who would be socially minded, responsible, competent—the man who could be trusted with power.

Every Individual Counts in Our Conception of Social Organization.—A new leaf in the book of human progress is being turned in the development of a dynamic social responsibility. The programme of health service now being realized in our schools is an expression of our philosophy of the supreme value of every human being. A rough analogy borrowed from Cooley's *Social Process* serves a happy purpose here. Social forms are compared to the wild grapevine extending itself over trellises and fences and into trees. "The vine has received from its ancestry a system of tendencies. There is the vital impulse itself, the bent to grow. There is its habit of sending out straight, rapidly growing shoots with two-branched

tendrils at the end. These tendrils revolve slowly through the air, and when one touches an obstacle, as a wire or branch, it hooks itself about it, pulling the shoot up after it. A shoot which thus gets a hold grows rapidly and sends out more tendrils; if it fails to get a hold, it by and by sags down and ceases to grow. Thus it feels its way and has a system of behavior *which insures growth along the line of successful experiment.*"*

The whole social fabric depends upon the growth of the terminal buds of evolution, human beings. Without a chance to grip some obstacle (opportunity) the individual not only fails to pull himself up, but society sags just to the extent of individual failure. In applying the rough analogy of the grape-vine, it is not only obvious that the new shoot pulls itself up, but by the co-operative pull of all the new shoots the whole complex organization of interwoven vine is lifted up. Strictly speaking, we do not institute our fledgling youth into their rich social heritage; that inheritance, the achievements of the past, can have significance only in terms of self-activity of individuals. The individual is not a passive recipient of culture or of values stored up, but rather in him lies the responsibility of giving our racial and social values expression and significance.

We are the creators of new values. The race has learned to walk, but that fact does not excuse the individual from learning to walk. The tortoise needs his shell. He can't discard it and hope to assemble scraps here and there and make one out of these parts. He must grow one fit to serve his needs in his environ-

* Cooley, C. H., *Social Process*, p. 8 *ff.*

ment. Old institutions served their time and day. But to hope to use an old institution suited to other times with its old forms is a vain expectation. We have the task of creating our own institutional means to serve our present needs. We have got to build new modes of expression to fit new times. New times are on us. We have got to go on recreating our world and adjusting ourselves to new demands. The old shell will not serve us. The old scraps can't be patched up into a new cover. The old garment knit for covering and shelter of a bygone age will not suit us nor serve us in our day. The definitions of education which served a yesterday custom and practice will not be adequate for our new order. The challenge of creative evolution is: "If the organism needs an eye, it grows one."

Freedom and Development.—The highest expression of freedom, as suggested above, is the "free" and ordered execution of the pianist, the fine technic of the skilled surgeon, the expression of trained and expert ability in any direction. In the processes of growth and self-expression there are degrees of freedom attained through "try-out," through trial and success, through gradual and progressive experimentation. Moreover, freedom, except in the highly technical lines and specialized professions, is a function of development, and achievement in certain general directions becomes basic and functional in new pursuits. The child entering school, for example, has gained a marvellous freedom in oral language. Ability to use language, to read the printed page, is a prerequisite to the study of geometry, chemistry, history, etc. The interdependence of capacities, the unity of experience,

as well as the variety of achievements, should be emphasized. Every performance is the expression of the synthesis of life at that point, the resultant of all the forces of the organism.

Self-Fulfilment vs. Survival Theory.—To urge the thesis that freedom means capacity, the release of potentialities through self-expression and education, tends to place responsibility upon man, where it properly belongs. The tendency, so often, has been to shift responsibility to a place where it is borne without a murmur. A prodigious amount of energy, sufficient to produce intellectual lockjaw, is spent in getting capacity securely *aufgehoben* in the absolute. There is for the educator a wholesome bit of philosophy in the theory that improvement in power is fundamentally a function of exercise and effort, rather than a function of structure: it serves to keep alive a healthy optimism in education. It is a far cry from the philosophy which prompts the teacher to remark when the student is failing, "*He can't learn it*," to the philosophy which enables one to say, "*He does not learn it*," or, "*He has not learned it yet.*"

The whole theory of survival, a comfortable doctrine for those who survive, is a statement of *what is*, not a declaration of *what ought to be*. Can there be doubt any longer that tens of thousands of children are stunted, dwarfed, and distorted only by lack of opportunity? Not all the deteriorate are degenerate. Nature knows no such differences in original nature as are revealed constantly between the fortunate and the unfortunate. The unfortunate, from an educational standpoint, are not confined to the misery class, the extreme poor in worldly goods. The white flag of

surrender is run up by the pampered and ill-trained of many a home in which the financial struggle is hardly felt by the children. The lethargic and moribund minds are found to cut across lines of cleavage of social groupings. Inequality made by circumstances accounts in large measure for differences in school achievement. The hideousness and inefficiency of existing provision for the physical, moral, social, intellectual, and, in the later teens, vocational development of all the children and youth of the nation must be pointed out and appraised in arriving at a fair judgment of the adequacy of educational opportunities. Absolute equality of circumstance is not desired; but equality of opportunity, not uniformity of condition, is demanded in order that each individual may develop to his full stature. The wholesome doctrine of self-completion is substituted for the doctrine of survival.

Alternate Leaderships.—The famous shibboleth, "*liberty*, *equality*, and *fraternity*," gains a new significance in the view that freedom is an achievement, not an endowment. Individuals are never equally free in attainments.

An outstanding fault of democracy thus far has been an impatience with trained and technical ability. A certain claim to omniscience is often stubbornly defended in the persistence of the Jack of all trades and master of none. To admit inequality in capacity would seem to argue that one man is not as good as another. All this wells up out of the low mythology of our political democracy. (One recalls the policy of President Jackson in ushering into office the intellectually disinherited.)

To-day, with increasing specialization in skill and

profession, our problem is to incorporate into American life a recognition and appreciation of alternate leaderships.*

This means, literally, that if on Sunday a man desires to have his spiritual needs ministered to, he may go to his church and bow before his minister; if on Monday he plans an investment, he ought to be able to go to his banker for expert advice; if on Tuesday he wishes to build a house, he should consult his architect; if on Wednesday he is in doubt about his health, he should call upon his physician; if on Thursday he wants to have a point in law settled, he should submit the proposition to his lawyer; if on Friday he is concerned about the education of his son, he might very properly seek the advice of the educator; if on Saturday his business calls for a new process of manufacturing, he must consult the scientist; and so on in a hundred clear-cut directions.

The main purpose of the common school, including the high school, is to lay those broad foundations that will enable the common man, and the specialist, to know, in general, what their specialists are about. In an intelligent and adequate recognition and appreciation of alternate leaderships, we are to discover the basis of a genius for a permanent and a scientific cooperation. In some such a conception a possible escape from the Nemesis of specialization is afforded, and at the same time a basis is laid for an understanding of life in terms of a complex system of "mutually interpenetrating interests."

Certainly, provision must be made for different

* A thesis ably worked out and popularized by President Suzzallo, University of Washington.

modes of excellence. "Each in his own tongue" expresses, in a way, a dominant characteristic of America described as a "People of Action." In theory and practice the American is an individualist. A flat uniformity, any form of equality, superimposed, would be secured at the expense of liberty. How to guaranty that individualism which our institutions have fostered and at the same time engraft upon that individualism the genius for co-operation is one statement of the problem of our social order.

Our Americanism and Education.—There has been in the United States a spirit of *give and take*, a disposition to *live and let live*. The freedom of democracy, the spirit of tolerance and friendliness, could be expressed with comparative ease as long as there was abundance of free land. Now, the frontier is a thing of the past. Our industrial order has introduced difficult and serious problems of liberty. Equality of circumstance is not essential to democracy. Equality of food, of shelter, of clothing, no man wants. That is surely not the way out. The school is not required to furnish a practising ground for that conception of equality, in spite of much in educational practice that smacks of uniformity. Our education should cultivate those elements in our national life which have enriched it from the beginning. Our motto, *One from Many*, suggests the process; it is a unity created by a process of drawing out and recomposing the best which each group, race, individual, has to offer.

The ideal is the claim of individuality as the supreme educational end. The highest form of democracy favors individual growth. In it every person would be free to draw from the common medium what his

nature needs, and to enrich the common medium with what is most characteristic of himself. The basis is laid in this ideal for a *shared life.* The individual is not lost in a mystical socialistic soul; the pernicious theory of the "melting-pot" method of building our authentic Americanism is escaped. The wholesome and practical theory of an associated life, built upon a programme of interdependent relationships, affords a truer basis for an understanding of our American ideals and social organization. In the last analysis this interpretation of nationality rests upon free-operating individuals, grown to their full stature as socially efficient personalities. In this conception the individual is priceless, and something more needs to be said about equality and liberty.

A Reinterpretation of Equality.—The stirring declaration of the founders of the Republic in the proposition that all men are *created* free and equal gives us pause. It does not help the situation materially to amend the proposition to read: All men are born free and equally ignorant. Perhaps there would be substantial agreement if the period is placed after the word *born.* For men are born no more free than wise or strong. All are born with a nervous system capable of unlimited development as an organism, and no presumption is so arrogant as that which attempts to forecast the future of growing, developing, lazy, indifferent boys and girls. When it is proclaimed, *now,* that the individual is *free,* or that all men are equally free, we hesitate, and begin to explain just what we do not mean by liberty.

It did not require the modern psychological technic of measurements to ascertain the fact that we are

not equal in any immediate finite attainments. Some truths are self-evident. The disposition, however, to refuse to accept any modern interpretation of equality does not meet with ready approval. Some reinterpretation is desired. May it not be valid to hold that human beings are equal, as persons;* and further, that all normally constituted persons are potentially free? This would mean that children are equal, never identical, in possibilities. It may be an extreme view to hold that all children are measureless in capacity; but it is, withal, a wholesome philosophy for the educator to act upon. It would seem that now with the tools and method of modern science a way could be devised by which personality could be released, and that they who are the "captains of their own souls" might have a realizable opportunity of becoming the masters of their own fate. The schools must reckon with the loss of external opportunities in the passing of the frontier, and by deliberate procedure seek to develop personal power, courage, skill, ability, and initiative in every individual.

Freedom vs. Caprice and License.—The caprice of determined ignorance is as dangerous to true liberty as autocratic authority exercised in the repression of the individual. Freedom is never idle, narrowly selfish, indifferent. There is no real freedom for those who resort to the spurious relinquishments of idleness, self-complacency, or asceticism. Plenty of men would like to have wealth, scholarship, some coveted goal of values, but they relinquish the effort; they stand outside the ropes watching the contest. Plenty of men

* Hudson, J. W., *The College and the New America*, chap. X, "The Meaning of America."

stop thinking to escape the disturbance of their beliefs and, by anchoring their boats in a safe and quiet harbor, refuse to suffer the pain of honest doubt. There are men, too, of ascetic disposition who retire from further effort after accepting or acquiring some accredited virtue or knowledge, even going so far as to give up what they have a right to in order to secure some supposititious effect upon character, forgetting that character is constantly formed and rejuvenated in the interactions of social life. The schoolboy, so frequently an artificial product, often exhibits symptoms of one or another of these spurious relinquishments. He withholds the hand that would pluck the highest honors; he may become stubbornly self-complacent through the painful process of information; he may reach a state when he thinks he is or has been "educated." These categories by no means exhaust the possibilities of explaining disagreements arising between the boy and the school.

Freedom in Work.—It is perhaps a bold philosophy which enables one to hold that boys and girls are by nature lovers of work. In a certain large family, well known to the writer, the constitution was adopted, not always without the consent of the governed, and a regimen was prescribed by a real father, disillusioned by any easy-going plan of letting the little things flower out under a sentimental general indulgence. It was a constitution, not so much one of power and arbitrary authority, as it was an instrument, an hypothesis, in which power was exercised and varied at the discretion of the members of that institution.

The motto which served as an ample preamble was: We propose to work in this home. Upon the adop-

tion of that constitution there was a *joyous freedom in work;* secession would have been treason.

There was no blind, unthinking obedience in that experiment. There was no clashing of interests in the alternation between authority and initiative; for the conception of *liberty in law* was established on a sure foundation. It was no compromise between authority and freedom, but a splendid integration of functions.

For those homes to-day in which the parents have abrogated authority and have become obedient to their children before the latter reach their teens, it may be remarked that the constitution may be adopted long before the child enters school. Dare one venture a bit of advice, aimed at all those parents and educators who go a-tinkering with children and youth: adopt the constitution and stop talking about it, and go forward finding zest for life in the pleasure of attainment and in a joyous *freedom in work.*

Paradox of Freedom and Authority.—The paradox of initiative and authority, of freedom and social restraint is an attractive thesis. The call for initiative was never so urgent as it is to-day. The demand for freedom was never so clear and strong as it is to-day. On the other hand, there never was a time when rational authority and social restraint were so absolutely essential to life and progress as to-day. The intelligent person will not fail to draw a valid distinction between the normal wish "to paddle one's own canoe" and a neurotic craving for relief from any form of social restraint.

The alternation between initiative and authority presents an amusing story. The young Puritan minister in his abounding enthusiasm gave expression to a

charming bit of philosophy when he proclaimed to the world: "*We came to America to worship God, as we please, and to compel everybody else to do the same.*" A dim survival of this doctrine is exhibited to-day in dealing with certain social problems arising out of the irresponsible exercise of so-called personal-liberty rights. Applied to the saloon, for example, a *free* translation of the Puritan's creed might read: We propose to be decent, as *we* please, and to compel everybody else to be the same. Or, to come at once to the problem of directing pupils in the path to freedom, it may not do violence to the spirit of those stern and hardy pioneers of early New England to adopt for every classroom the proposition: *We are here, boys and girls, to work, as we will, and to compel everybody else to do the same.*

The *free* action of the responsible individual is never characterized by caprice, or license, or intolerance, or arrogance. Even the fine old saying, "You shall know the truth, and the truth shall make you free," is not regarded as final. Now, with the technic of science applied to every phase of life, it is just as essential to act upon the corollary of this proposition: *you shall know the truth in order that you may not do as you please.* Any real boy soon learns that he cannot do as he pleases with the applications of electricity. Nobody now does as he pleases about contagious diseases. It is a notable step in the progress of civilization to advance from the irresponsible, careless, indifferent practices of a theory tainted with any form of selfish personal liberty—a do-as-you-please policy—to a straightforward, intelligent, responsible conduct arising out of the conception that *the free man must*

do as he wills. This higher view carries with it a desperate responsibility. Freedom of thought implies the responsibility of actually doing some hard, straight thinking.

The professor is hardly licensed to indulge in unlimited monologue merely because he has worked out his problem more elaborately than his students. The schoolmaster finds it exceedingly difficult to give up status and an ancient habit of regarding himself as the law. We still hear it proclaimed that students can't think; that before students can think they must acquire certain dabs of accredited knowledge at stated intervals, as if we were first to collect some facts and *then* go off and do some thinking.

The Pupil in the German System of Education.—Alexander, in visiting the Prussian elementary schools, remarks that in observing some 300 teachers at work not a question was asked by any pupil. The German teacher in the Volksschulen explained it all by saying: "I have said everything about the subject that the child needs to know. My explanations have been clear. What has the child to inquire about?" And again, if the pupils were permitted to ask questions: "Why, that would destroy the discipline and regular order of the lesson. One would never get through with the work planned." *

One of the most frequent commands in the German Volksschulen is: "Wiederholen Sie das" ("Repeat that"). The pupil repeats, recites, reiterates as a recipient. The pupil is commanded to listen to what his teacher tells him in order that he may tell it back again as it is told. His general attitude is that of pas-

* Alexander, Thomas, *The Prussian Elementary Schools*, p. 277.

sive obedience, unthinking submission to authority, uncritical acceptance of accredited subject-matter. The primary emphasis is placed upon capacity to remember. The instructional ideal is paramount. With a constant appeal to memorization and reproduction there can be little creative thinking. There may be a good deal of rationalizing in accepted beliefs and communicated doctrines. Rationalizing, however, is uncritical and is for the most part merely a passionate defense of a belief already accepted by tradition or authority.

The reproduction of a part of a geography lesson is given to indicate the method employed in the Volksschulen. The method assured the results desired in Germany by the ruling class prior to 1914. While discipline is not conducted on a military basis, the teacher in Germany commands authority, and for the most part, as a representative of the state, finds measures for the ready enforcement of commands. The rigidity of the German method is lodged in the control of subject-matter. The pupil is required to memorize what he is told. There is practically no opportunity for creative thinking. The German method, at its best, does not seem to be the kind of thing for America to imitate. If a very considerable part of the authority and respect which the German teacher enjoys is removed, then an imitation of such a procedure as indicated below is barren and empty. A recitation lesson is presented on page 175 from an American schoolroom. A comparison would be illuminating. The latter has many of the external characteristics of the German method; yet with the supports of the German system removed, one readily appreciates the utter

collapse of the procedure. Moreover, if the system works admirably in the realization of one type of national ideal, it does not follow that a faithful adaptation of that system would be effective in the realization of a totally different type of social theory.

GEOGRAPHY III CLASS, FIFTH YEAR. BOYS *

Teacher. Where do we live?
Pupil. We live in Europe.
Teacher. What is your Fatherland?
Pupil. Germany is my Fatherland.
Teacher. All together—Germany is our Fatherland.
Pupils. Germany is our Fatherland.
Teacher. Germany is shut in by many other lands. What country is to the west?
Pupil. France.
Teacher. We shall hear something about this country to-day. What country are we to hear about to-day?
Pupil. We shall hear about France to-day.
Teacher. Once more.
Another pupil. We shall hear about France to-day.
Teacher. All together.
Pupils. We shall hear about France to-day.
Teacher. What is the name of this country? (Teacher had written the name on the board.)
Pupil. France.
Teacher. Who has ever heard of it? (Several hands were raised.) What have you heard?
Pupil. It is a republic.
Teacher. All together—France is a republic.
Pupils. France is a republic.
Teacher. What is a republic?
Pupil. A republic has no king, only a ruler.
Teacher. Not exactly.
Pupil. France is not ruled by a king, but by a president.

How utterly lacking such a procedure is in a practising ground for morality! Doctor Foerster, Germany's

* Alexander, Thomas, *Prussian Elementary Schools*, p. 445 *f.*

leading educator, condemned that system before the war. It is related that he favored the introduction of the best features of the English system of education in order that the children and youth of Germany might have a share in the activities of the school and, with Arnold, of Rugby, work toward the development of personal initiative and responsibility. If the school dwells exclusively on "*deeds as done*," and by repressive, authoritative measures dogmatically furnishes the educational "abracadabra"—both the accredited subject-matter and the accredited method—the ground for practicing morality is cut from under the system of education.

German education confused external discipline with self-control, regimentation with corporate spirit, and concerned itself with an emphasis upon the nation's duty in terms of "culture" (Kultur) rather than self-realization and character. The school system in point of organization did not allow the child to make his own associations, but had them forced upon him.

An Example of a School Under Complete "Freedom."—Unthinking obedience is not desired in a democracy. The difficulty in working out an integration of freedom and law is recognized. The schoolmaster, as the personification of the law, has too often neglected his responsibilities in the development of freedom. To fly to the opposite extreme and totally disregard law in the hope of attaining liberty is likewise futile. Lyof N. Tolstoi sketches the performances of a school given over completely to the doctrine of unlimited "freedom." It is the Yasnaya Polyana school.* The pupils in this school sit wherever they

* Tolstoi, Lyof N., *The Long Exile*, pp. 164–300.

please. There is much external disorder. Under an unrestrained development the pupils exercise the right to get up and go home if they feel like it. No one, not even the teacher, is supposed to exercise restraint. Schoolboy fights are common. The employment of force by the teacher is thought to lack reverence for human nature. After disorder and the flow of animal spirits (unrestrained) better and more stable order than we imagine seems to establish itself. The intriguing thing about this school is the fact that the pupils all want to learn and that is the only reason they go to school. It is reported that they have a society united by this single impulse to learn, and that they subject themselves to whatever laws they discover to be essential to their own well-being.

These two extremes, one an emphasis upon authority to the neglect of freedom, the other an emphasis upon freedom to the neglect, at least, of organized law, illustrate attempts to consider authority and initiative as separate ideas. We shall attempt to work out a practical interaction or integration of these two principles under some such conception as *liberty under law*, or liberty armed with the law.

The Problem of the School in the Development of Creative Thinking.—At the Chicago meeting of the Department of Superintendence, 1919, the following appears in the resolutions:

> The schools nourished the spirit of democracy and produced a soldier whose initiative, resourcefulness, courage, and morale were the marvel of the world, etc.

All these fine traits were exhibited by our gallant young men. What we should really be concerned

about in this claim is, are we, in our schools, responsible for making *thinking* boys and girls? Do we make deliberate provision for training of initiative, resourcefulness, inventiveness? Or have we in America unwittingly imitated the rigidity of modern Germanism in which the tendency is to sacrifice life to the majesty of plan and precision, and to subordinate thought to mechanical logic? The implied answer is that we are guilty in several counts in the indictment.

In one of the splendid high schools in one of the three highest ranking states in the Ayer's report, the amazing situation disclosed in the following letter actually obtains in *democratic* America. Let this remarkable teacher reveal to the reader an intimate account of her relations with a typical pedagogical commandant who stands as an exponent of the external mechanical type of supervision in our schools. His name, whether supervisor, inspector, or the modern efficiency expert, if not legion, is unfortunately very common in our *democratic* education. This letter depicts a sharp antithesis in our educational practices between two irreconcilable ideals:

Dear Mr. ——:

I am in trouble and just must tell some one about it, so if you don't mind I'll turn to you. I've been teaching here a little over two weeks, English and Art, departmental work—and I've tried to establish a "must be," and still remember to get *down* with the pupils. We've been a prospecting party, these pupils and I, and we have helped each other, but we have not always gone in order. One day the supervisor came in when we were all working at the board, thirty-seven of us. One in each group of six was watching for mistakes in the other five instead of writing. Lively discussions over certain mistakes were taking place in whispers and undertones. I was having a life-size *job* settling

disputes and flying from group to group to urge them to maximum endeavor. I didn't have time to talk to the principal and there was no orderly recitation for him to listen to; and so he left, soon.

Next day he came into an art class. Two boys were working out a poster design in one corner on board, and, I remember, talking out loud. Three or four were practising printing on the board, and at least a dozen were gathered around me learning a shading stroke. Well, to make a long story short, he walked out. But to-day in teacher's meeting he lectured for an hour on discipline and order, and he looked straight at me and said: "I've noticed that some of you have beautiful theories of developing individuality and using the new-fangled 'method' of letting the children do as they please, but I want you to understand that we can't have it in this school—we *must* have uniform rules, etc., etc." *You* know what he said, and I *hope* you know my blood boiled! He even told us absolutely *not* to let a pupil say one word without raising his hand— There is lots more, but you have no doubt heard this story before, so I won't inflict it upon you. But to-night I am heartsick. I've so incorporated ideas of socialized procedure into my thinking that they are there to stay. Thanks to you, Mr. ——. I don't want any tombstone order in my classes, nor any "methods," but can I defy that man?

Just writing this to you has given me courage to dare, even though I don't send this letter! Perhaps I shall send it, and if I do you will know that I am going to try to "keep the faith." I feel like a missionary in a foreign land, or a bug crawling about under a bottle. But I can see through the bottle, and get a vision of what's beyond, thank goodness!

This has done me much good and I hope you haven't minded.

Very sincerely,

———————.

The following statement (modified slightly) illuminates this practice:

A very serious mistake is being made in both schools and colleges in the attempt to establish uniform standards and thus seem to make all pupils alike or to introduce different levels of

group mediocrity. The startling degree of uniformity and mediocrity attained is evidence of the deadening influence of grades and tests. So far American Educators have shown very little regard for cultivating the influences which tend to strengthen original thinking and the formation of independent judgments upon intellectual subjects. Now with scientific attention paid to individual differences we may hope for a decided change in opinion in regard to the conventional standardization of thinking which has been such a hindrance to progress.*

Practices Surviving Inconsistent with our Philosophy of Life.—It remains to work out the paradox; for the spirit of tyranny and the spirit of freedom are hopelessly irreconcilable. Beating a boy one minute and telling him the next that he is the responsible master of his own destiny never did work well; it works much less effectively to-day than ever before. Usually our rewards and prizes are, in effect, inverted punishments.

The schoolmaster has always been resourceful in the invention of pedagogical devils. To be sure we have advanced far beyond the crude methods of the old disciplinarian whose primary object was to keep school and hold the class. The appeal to-day is more and more coming to be based upon work, pleasure in achievement, zest for life.

"The militarist ideal appeals not only to the interested parties in the governing classes but also to incompetent teachers, and that is a further source of danger. The real educationist demands individuality of treatment and insight into the personal needs of every pupil, the militarist (the disciplinarian) demands nothing but regimentation and teaching by rule—the latter so attractive to the incompetent teacher." †

* Paton, *Human Behavior*, p. 434.

† Langdon-Davies, John, *Militarism in Education*, p. 106.

The tired and incompetent teachers find it necessary to resort to methods of external discipline. For them the usual thing is to start with the proposition that order is heaven's first law. For those who desire the development of self-control and the corporate spirit, heaven's first law is work. Order follows out of the work spirit.

Some safe steps have been taken in the direction of a fruitful socialization of procedure in which it is maintained that it is more important to assist pupils toward freedom in holding themselves than to "hold the class" in order, primarily for the sake of order.

Yet we still resort, too often, to primitive threats such as failure in the course, the danger of not being promoted, the conference hour as a means of correction, or, as a last resort, dismissal from the class or school, little realizing that we do not improve teaching by dismissing pupils from the class or school. The particular kind of operation hastily decided upon is not always performed with the privacy that the exigencies of the case would seem to warrant. There is a persistence in the claims of the efficacy of the doctrine which seems to inhere in making some recalcitrant boy the sacrificial goat. Some vicarious effect upon the group is sought in the open and direct method of *operating* on the "bad" boy. Scolding Tom before the class serves to reaffirm the conviction of Tom's father who asseverates that Tom will do anything but work. Tom is usually corrupted to the very roots through lack of home training and perhaps through repressive school training as well.

The trite story of Bill and his schoolmaster may serve "to adorn a tale and point a moral." It was

always open season for the schoolmaster in Bill's case. Bill, a "near" dunce in the estimation of the schoolmaster (like Darwin, Edison, Watt, Hume, Scott, and a long line of illustrious men and women),* was conspicuously labelled with the pedagogical scarlet letter. On one occasion the schoolmaster yelled at Bill in thundering tones, saying: "Bill, you lazy boy, don't you know Lincoln at your age was earning his own living?" "Yes, I do," retorted Bill, "and at your age, sir, Lincoln was President of the United States."

The subject of this chapter is, in itself, so important that it is felt by the author that he might be permitted to insert here, by way of foot-note, a letter on "Raising Boys." It has been printed in the Wisconsin *Journal of Education*. It was written as a suggestion to all those who go a-tinkering with this delicate problem of *educating* boys. Perhaps the privilege of the first personal pronoun, a privilege reserved for the preface, will be granted in this connection. The letter may be an appropriate summary of the chapter.

Raising Boys

In order to attain the high place of democratic freedom, all men and women must become self-active, responsible persons.

There must be an instant and willing obedience, not alone to rightly constituted authority in home, school, and government, but in the daily task, whatever it is. A *must be* is imperative in every personality.

Delayed obedience to either rightly constituted authority or to this *must be* is fatal.

Whenever the issue is, "This thing shall or must be done," then there ought to be no hesitancy whatever in the decision.

* See Swift, *Mind in the Making*, chap. I. The reader will find here a wholesome tonic and a needed antidote in facing the problem of educating the youth of the nation.

Obedience to that must not be argued. It is the instant and willing obedience here that gives us the very core and heart of the gentleman. He never talks back, he never whines, he never complains about the proposition "It shall be done, or it must be done."

The *must be* in its best form arises within the person. He sees his duty and responds with instant and willing obedience to this inner mandate. This is the object of the external mandate of authority. It must lead to this inner response and attitude.

To permit delay in either case is to lead to irresponsibility, indifference, and, ultimately, dishonesty.

Lesson I.—If it is a matter then: "To-day the lawn must be mowed," or "This work must be done now," or "The studying of this subject must be begun regularly at 7.30," or "You may not go on the lake"—all such situations must not be argued; it is instant and willing obedience then and there that is absolutely imperative.

To permit delay in the matter of obedience leads inevitably to a shirking of responsibility, to shiftless procrastination, to "back talk" and bickering, and all sorts of exasperating situations.

The other side of constructive attitudes is coming. Just now the foundation must be laid for the "free" execution of the pianist, and for that, any trained and expert ability. The home and the school should have Lesson I, if it is needed, very early and then stop talking about it.

One time my father told me to go out and get a switch. He found that I had burned my boots. I was eight years old. The morning was bitter cold. I left the house and went into the barn and crawled way back in the wheat-bin. Father became concerned and went out and called me. I would not answer. When he found me I was almost frozen stiff. I was abundantly warm by the time I got to the house. Father whipped me all the way with a flexible strip of board. He did not whip me because I burned my boots, but because I refused to answer him. That was a lesson I never forgot. It was always made clear that we were never punished except for one thing, disobedience. There was transfer of training in this experience not alone for myself in this case, where there was an obvious immediacy, but also for seven brothers and sisters who envisaged the experi-

ence by the exercise of their powers of abstraction and imagination.

Now, the constructive work lies in *freedom in work.* "The lawn is to be mowed to-day." No debate arises on that fundamental issue. We may talk about it after unqualified assent, *i. e.*, after the "must be" is settled. Then it is perfectly proper and wholesome to go into plans about mowing the lawn, about what part of it may be done thus and so. *Freedom in work* is just as imperative as instant and willing assent to both the external and the self-initiated mandates.

Lesson II.—This proposition, described in Lesson I, must be clearly differentiated from another type of conduct. When the home or school asks, "Shall we do thus and so?" "Would it be a good plan to mow the lawn to-day?" "Would it not be a good idea to spend an hour a day in reading?"—all this lies in a totally different realm. Debate is elicited by the very nature of the question. "John, don't you think it would be a good plan to study chemistry next year?" or "To build a hog house by the barn?" All such language invites debate and reaction. The outcome is not the essential matter here. John is growing in power of self-direction if he wins in the argument on the negative side. The adolescent needs to express himself within Lesson II. Parents and teachers should assist boys and girls in the adventure of becoming self-active, responsible men and women. The argument here is not mere idle talk. Youth needs many and varied opportunities for wholesome self-expression. Lesson I has been learned. Perhaps it may be necessary to recall it once in a great many instances while practice is being carried on in Lesson II. Not infrequently Lesson I is interpreted to mean passivity. We do not want unthinking obedience. It is well to study with great care the form of language employed in Lessons I and II. In the former the "must be" is employed; in the latter it is a "shall we?" or "would you like?" etc. The latter invites challenge, discussion, and self-expression.

Lesson III.—I think there is still a higher realm, one that can be attained very early in life after the first proposition is settled, *i. e.*, after the "*constitution is adopted.*"

When I was thirteen years old father said to me: "You may take the full responsibility for the crops on fifty acres." I did it, and I did practically all the work, too, up to harvest-time.

My father was sure that I would come to him in a dilemma. He perhaps did not agree with me in every detail. That did not matter so much. Now here is a proposition which to my thinking is absolutely essential in the enterprise of developing personal power, self-initiative, self-respect, pride, self-mastery, independence, and that which insures a "free" execution in any direction, in profession, business, or skill.

To stop with mere obedience to external mandates will not do any longer in our form of life.

To fail to develop from within that sense of a *must be* is a tragedy.

Freedom in work is the only true basis of growth. This applies to all sorts of work and situations, in the home, in school, on the farm, in factory, in profession. But it is freedom in work, never a disposition to delay or refuse to work, that must be made crystal clear.

I do not believe in imposing any task simply for the sake of exacting obedience. It is unwise to provoke situations in which the issues of discipline are confused. The Egyptian priests spent hours every day watering dry sticks planted in straight rows in large fields. They did it to discipline themselves. We are committed to something better. We want grain or trees planted there instead of dry sticks. The watering and the work then have a purpose beyond formal discipline and stupid routine.

But what we have got to correct in our American life is this:

1. "A disregard of discipline as a virtue too closely allied to servility."
2. "A contempt for obedience as seeming to smack of docility."

And while correcting our life in these two respects we must obviate the dilemma of unthinking obedience. "The slave has always been infatuated with his servilities." Our task must be the ordered relation of parts in a purposive whole.

CHAPTER VIII

SUCCESSES AND FAILURES IN SCHOOL WORK

Theory of Success.—"In every child is the stuff of aristocracy. By that we mean the high potentiality of childhood and youth for uprise or downslide, according to circumstance and opportunity. A child's mimetic powers are tuned to the pitch prevailing in whatever concert-room it happens to be an occupant of. Its creative genius moulds its own personality on the model of whatever performances happen to be staged there" (page 217).

In all forms of life from the lowest simple cell-life to the human—to the terminal buds of cosmic evolution, in every form of life—there is first of all a disposition, with characteristic habits, *to grow*. This is true of the terminal branch of the grape-vine; it is true of the human sprout. Growth is insured along the line of successful experiment. By pruning, by cultivation, by fertilization, and by control of environment certain objectives may be attained. Success is *largely* a *function of effort*, of exercise, not alone a function of structure. Hence, it is not what is *originally given* that should be accepted and paid heed to, but rather what happens after the thing has been subjected to *this* and *that* situation, to *this* and *that* experimental control. In short, *if the organism needs an eye, it grows one*. This view of life gains a new significance in the realm of conscious will.

In this statement of possibilities and outcomes the

educator swings out boldly under a new scientific humanism founded upon the theory of self-completion. The old Neo-Darwinian doctrine of the survival theory is useful in a social interpretation of life in which a mechanical conception prevails. In that theory the individual is a machine, a thing to be discovered and trained to serve ends set up by authority. A selected group is endowed with power to discover the particular abilities of the common folk, train them for what they are fit for, and defend the *status quo* at all costs. There is another theory of society. It is the democratic conception. Man is not a tool, an animal, a servant, or a machine. He counts and has absolute worth as an individual. Being a living, conscious, willing personality, he is to discover the purpose of his life.

There has come a reaction from the belief in inborn heredity as the main factor in social evolution; it has been proved that social heredity, or the environment which rests on the child, is of far greater importance than has hitherto been realized. On the one hand, there is the slow evolution due to changes passed from parent to child through many generations, a process which has been responsible for the biological evolution of the animal kingdom; on the other hand, there is the possibility of a much faster social evolution due to the power to change the emotional environment of the children of a nation.

The ruling class of Japan determined for their own good that Japan should become a commercially wealthy nation. To do this it was necessary to recast the whole system of education by suffusing it with a new spirit.

By collectively submitting themselves with full intent to a new kind of social inheritance the Japanese people attained in less than two generations to a position which it has taken the principal Occidental nations centuries of stress to reach in the ordinary process of development.*

* Langdon-Davies, John, *Militarism in Education*, p. 11 *ff.*

In the case of Japan it would appear that the old saying requires an additional word (*nisi*) to make it read *Natura fecit nihil nisi* (except) *per saltum*.*

This new giant of Western Power entered the arena for a part in the competitive commercialism of the world when she exchanged contemplation of the stars of her Eastern night, her tranquillity of spirit, and a refined and artistic enjoyment of life for another ideal. Education is far more than the training of the intellect. It is also a training of the emotions to react to special ideals. The educator should not insist on making a sociological truth of the physiological doctrines of Darwin.†

It is more than questionable whether, except as regards the stamping out of pathological taints (which are amenable to other remedies), eugenists, if they were given *carte blanche*, could achieve anything desirable. But the evolutionary products which are dependent upon physiological heredity are altogether inconsiderable compared with those which are not dependent upon that process. There is something tragically pathetic in the zeal displayed for improving the race by the control of physiological heredity, while at the same time the means by which the products of human evolution are in fact transmitted, and which *are* directly and easily amenable to human forethought and management, are under present conditions, and under a so-termed "system of education" of almost troglodytic crudity, abandoned to the mercy of chance, or rather stultified and perverted to defeat the ends of evolution.

If we are superior to our woad-painted ancestors, it is not so much that we are born with higher qualities, but that we are born in a human environment in which the achieved results of rational thought have been from generation to generation handed down. And those very qualities which are physiological and hereditary are themselves correlated with conditions arising

* "Nature has made nothing except by a leap."

† Cooley, C. H., *Social Progress*.

from the accumulated products of rational power and human control. So that even if those slight physiological modifications could be cultivated, while non-physiological progress was arrested through entire neglect, the improvement of those slight products themselves would tend to cease through the drying up of the source whence flow the conditions which produced them.

The products of human evolution are not included in the characters which physiological heredity transmits. The human world in all its aspects, including every race and nation which exercises an influence over others, which exchanges thought, opinions, and knowledge, contributes arts and inventions, including every current estimate and conception, and every revolutionary thought, the customs, manners, and habit which are in vogue, the social organization which obtains, all the conditions arising out of it, the forms of government, the institutions, the beliefs, and above all the types and systems of ideas, the standards of honor and of conduct, the point of view, the norms of judgment, the sanctions, biases, and prejudices shaped in accordance with the relations and interests attaching to those conditions, that human environment which supplies all the contents and powers, shapes all the tendencies of every mind which is born and matures in its midst—that is the carrier of heredity in human evolution.*

Nothing is more unfortunate than the notion now so prevalent that a mere acquaintance with the formal details in the technic of examination is sufficient guaranty that accurate information will be obtained. At present the disadvantage of placing too much confidence in methods is illustrated by the indiscriminate application of the so-called intelligence tests. These tests are often made by persons who have had no clinical experience in observing human nature, and they are therefore not competent either to select the cases in which satisfactory results can be obtained or to express a critical judgment upon the relative value of the different data.

It is surprising how far academic psychologists without any accurate knowledge of the machinery concerned in the emotional adjustments will attempt to go in interpreting data gathered from intelligence tests. The penchant to stretch a fact so

* Briffault, Robert, *The Making of Humanity*, p. 62 *ff.*

far as to obliterate any trace of incompleteness in a history is a constant source of error.*

The current opinion that creative genius is a quality reserved for God's elect, the lad o' parts, is hard to combat. A. Clutton-Brock † reminds us that every person feels he has an unrealized genius, a baffled creative faculty which might some day surprise a stupid world. In every one is an unexpressed genius, and if only by some talisman, by some opportunity, we were suddenly forced to speak out the truth, we should all proclaim our genius without listening to each other. He says: "I believe in it for myself, believe that it does exist, not only in myself, but in all men, *and* the men of acknowledged genius are those who have found a technic for realizing it. I say *realizing*, because, until it is expressed in some kind of action, it does not fully exist; and the egos of most of us are exorbitant, however much we may suppress their outward manifestations, because they do not succeed in getting themselves born. The word is never made flesh; we stammer and bluster with it. We seethe and simmer within; and though we may submit to a life of routine and suppression, the submission is not the whole self; it is imposed upon us by the struggle for life and for business purposes and, unknown to ourselves, the exorbitant, because unexpressed, unsatisfied ego finds a vent somehow and somewhere."

It would seem to be begging the question to allege that genius eludes measurement, if it turns out that creative thinking is a possibility for all normally con-

* Paton, Stewart, *Human Behavior*, p. 374.

† A. Clutton-Brock, *Atlantic Monthly*, vol. 128, no. 6, p. 727, "Pooled Self-Esteem."

stituted individuals. May we not need a new technic that will transcend mere *rationalizing*—that form of thinking which is concerned with a defense of a belief already accepted? The essence of the scientific method is creative thinking. Perhaps our task in this twentieth century is the development of the science of human behavior in educational practice to the point of making it possible to *realize* genius in every normal person.

These quotations are not presented for the purpose of *rationalizing* a belief already arrived at by the author; the real purpose is to suggest a line of investigation into a vast body of biological and sociological material pointing to a theory of success on the basis of experimentation in the direction of self-expression. The common belief is that a Ford car is just a Ford and nothing more; that it is folly to expect the transmutation of it into a Packard. The argument by analogy is full of fallacies when applied to human beings. It commits us again to a hopeless predestination. The major fact is *automobility;* the individual expressions of it are dependent upon circumstances. Each make of car, each individual car, runs under its own power. The materials which are utilized in the making of a given car might have been assembled (constructed) in any one of a number of ways. Moreover, the common highway is used by all the cars, each gripping whatever is essential in its own motion. The usefulness of the car is not preordained; in fact, it is absurd to make comparisons to the effect that one car is more useful than another. The Ford may arrive ahead of its aristocratic competitor in the journey; it may have to pull a fine, big comrade out of the ditch.

All use the common highway, and no one is disgraced by the presence of another. For *automobility* let us *rationalize* a bit, too, by substituting *humanity* and work out the relations of individuals in terms of a democratic order.

The problem is not to be stated in terms of any standardization of mediocrity. Endless differentiation ought to be expected. This is not a plea for equality of anything save equality of opportunity for a full life, abundantly expressed in some direction. It is not a denial of the assumptions of original characteristic traits; it is rather a shift of emphasis over to the proposition that any true liberty is an achievement, not a donation. Whatever power (or freedom) one has at any time is the power (or talent) he has worked up to.

We now need pediatric clinics in which normal children and youth may be given opportunity for a full-orbed development. In this new clinic the histologist, the psychiatrist, the psychologist, and the educator should work together in the quest of a scientific development of human powers. We ought to know *now* that it is abominably unjust to scold and punish a child who is in the grip of a set of defense mechanisms quite beyond his control for the time being.

We shall soon be able to cope with all sorts of protective coloration resorted to by boys and girls in their ways of adapting themselves to the artificial standards devised by schools and colleges. We ought to be able to institute an environment in which there could be the full release of all the wholesome potentialities of children and youth. Real guidance and direction may soon become a scientific achievement. It will be none

the less humanistic in spirit when rationality may be had in dealing with human behavior.

Empirical Pedagogy and Uncritical Philosophy.—In our attempts to explain the causes and conditions of successes and failures we are still in the Dark Ages of primitive pedagogy. The drag of inertia of tradition is nowhere so evident.

The boy succeeds in Latin, fails in algebra, does indifferently well in music. Why is it so, or at all events apparently so? Or, to put the situation perhaps a bit more clearly, why does one pupil succeed in certain studies, *A*, *B*, *C*, and another fail in them, but gets on in some other lines, *X*, *Y*, *Z*? Why does he fail so ignominiously in Latin but succeed in stenography? Is there anything to be said for the method in the latter?

The aristocratic method has always been based upon the doctrine of the "saved and lost." The old dualism persists. There is man and hardly-man. Lurking in the system somewhere has been the conception of fate or foreordination. The special technic by which the unregenerate could be saved becomes stereotyped. Certain channels come to be the only ways open to educational salvation. Favors are reserved for a selected group. This general philosophy gets into every phase of life. Education does not escape the blight of aristocratic methods. It is amusing to find teachers and educators in this day of the American high school holding opinions about special courses and pupils of ability not unlike a member of the High Church of England who on being interrogated as to the possibility of being saved by any other route replied that "he would not exactly want to say that there is no

other way, but," after a moment of agonizing followed by a lucid interval, he hastened to say, "no gentleman would seek any other way, don't you know."

An attractive little book by William Hawley Smith, entitled *The Haves and the Have Nots*, represents a very common attitude in the schoolmaster's philosophy. It is amusing to observe the frequency of occurrence of the words "*those who*," employed by writers and speakers who are toying with vocational guidance and school schedules. Classification has always been an easy way of escaping responsibility.

If we fall back upon the theory of "gifts," upon the thesis of donation or endowment, insisting that power is solely a function of original structure, then it is that classification is likely to be made in advance of the journey. The chance for frank and honest, gradual and progressive experimentation is practically lost. The absolutists in education have always indulged in the habit of loose prophecy. Upon meeting difficulty, some hasty judgment is formed with respect to original nature. Thomas Edison, it is alleged, was sent home from school with a note: "It's no use. Tommy can't learn. He ain't got the apparatus." We are dealing with the careless, uncritical, unscientific temper of writers, amiable lecturers, and pedagogues, and a lot of "educated" folk in their attempts to appraise human stuff. And, moreover, we have had fifty years of Neo-Darwinianism—a ready acceptance of a blind evolution mechanically driving the cosmos on to perfection. The dogmas of self-preservation, the will to live, the survival of the fittest, innate ideas, and a doctrine of absolutes have contributed to the confusion of knowledge about life, progress, development.

As long as we are confronted with the pernicious belief that geniuses are born and not made, it is extremely difficult to develop the sounder principles of American life. Talent comes to be a donation, a gift, an endowment, a quality inherent in structure. All this is a survival of the old dualism expressed in various forms: master and slave, saved and lost, man and hardly-man.

Self-Completion vs. Survival Theory.—The new emphasis is self-effectuation, progress, differentiation. Man selects a change which he wishes to have brought about: individual exertion under and within the new conditions produces the change. The selection of a change does not make the change. There is growth in the direction of successful experiment.

The scientific method is employed in the new procedure. We actually set out to change the direction of life. Man asserts his responsibility in fabricating controls. His hypothesis becomes a function of activity. The scientist's hypothesis is never an absolute. There is a problem. A way of solving it is conceived. This tentative way (and it is an ideal, and it is the new faith) is what we designate as an hypothesis. The hypothesis is never an absolute. He who examines his facts, data, acts, experiences, finds that he must *re-define* his hypothesis in terms of activity; otherwise the performer is a tradesman, a copyist, a collator. The artist and the sculptor work by the scientific method. The novice or amateur at physical science or statistics who appeases the mathematical sense with formulas does not exhaust the possibilities of the scientific method. It has no one mode of expression. There is no set of values to which the scientific atti-

tude of mind may not ultimately be applied. It is for this reason that we are rapidly naturalizing the old supernatural zones which in the past have been accepted on the basis of authority, opinion, or blind faith.

If the thesis is sound, *that improvement in power comes by exercise,* it follows that progress under new and changing conditions is the central emphasis in education. A new responsibility is imposed. We cannot hide under the old shelters, the old absolutes. The boy does not succeed or fail because original structure is this or that; but every quality, talent, or power is an achievement, not a donation. At all events, there can be no improvement in power without exertion. The *will to progress* supersedes the *will to live;* otherwise how did the amœba ever get to be anything beyond itself? The hopeful scientific outlook is self-fulfilment through exercise. Our educational task is summed up in the problem of controls in the development of creative intelligence. What conditions shall be provided for the act of self-creation? Under what conditions will the candidate for personality *achieve, make progress?* Responsibility is shifted from some absolute and from a busy aimlessness and idle talk about destiny and outcomes over to man, where it belongs. If a boy succeeds, or seems to succeed, the real question is, has he been achieving somewhere near his maximum; if he fails, our attention must be directed to the conditions within which he has been "trying out." In either case the issue is never closed, whether success or failure is the apparent outcome.

Experimental Attitude toward Teaching.—The new school must be a creative educational unit, frankly

experimental, whose atmosphere, aim, method, and special contributions are so conceived and managed that each individual may grow to full stature. It is absurd to assert that any normally constituted individual is incapable of making progress in any course in the curriculum. The amount of progress is another matter; also, standards and entrance conditions to higher schools constitute problems in themselves.

The upshot of the matter is, we know very little about emerging powers and potentiality. We cannot by *ex-cathedra* methods be sure that conditions have been favorable for growth. What we need is a frank application of the experimental method. Uniformity of conditions and individual differences do not go together. With some hypothesis, never an absolute, we need to attack the problems of learning. An educational hypothesis, like the artist's hypothesis and the psychologist's and the physicist's, must lend itself to a developing process; *i. e.*, one's educational hypothesis must be a function of activities. It cannot be settled, defined, formalized. It must be a *growing* hypothesis.

Somehow our norms in education must be interpreted in functional terms. The problem of subject-matter in any course of instruction cannot be adequately studied apart from procedure values. The old views of accredited subject-matter are changing, just because the humanizing movement is taking root. Values are no longer thought to be absolute and inherent. Whatever subject has been held in the past to be an indispenable part of the curriculum should not be discarded because of tradition. Such a subject may conceivably be ideally adapted to the new situa-

tion, granting of course the validity of the functional basis of procedure in dealing with such a subject. A new interpretation of education in accord with changing social conditions does not carry with it any mandate to fabricate essentially new and different curricular matter. We shall have a clearer perspective on this issue once it is recognized that permanent or continuing processes are capable of incorporation in the new situations confronting society. Democracy progresses by the principle of extension of privilege. What has been reserved for a privileged or superior class is taken over by a developing democratic state and made universal. The secondary school was formerly a privilege for a selected group. We are rapidly democratizing the high school.

Regimentation in Educational Programmes.—We are now face to face with the old dualism, the old cleavage between "those who" may profit by one type of education and "those who" may not profit by that type of education. In the last analysis two camps are pitted against each other in the attempt to inaugurate educational programmes involving two opposing sets of ideas. It is asserted by both groups that success in algebra, music, etc., is determined by inherent structure. If such is the case, it follows that some division or classification should be made. Broadly speaking, the cleavage runs between education in liberal terms for one class and in vocational terms for another class. The interesting aspect of this dilemma lies in the fact that essentially the same philosophy is utilized to support both contentions.

The practical problem for one group of educators is to discover reliable means and methods of revealing

in advance of the experiment those alleged native gifts or talents upon the basis of which a tentative classification is to be made.

The development of psychological tests and measurements of intelligence has no doubt suggested a reliable, scientific procedure by which abilities may be ascertained. It is the scientific faith of a great many educators to-day that these instruments will soon reach such a stage of perfection as will enable school administrators to enter upon a fairly definite programme in the classification of pupils with respect to the two major types of education suggested. It is held by some prominent educators that this cleavage may be begun as early as the beginning of the Junior High School, while others are urging a later period in which to make a somewhat arbitrary classification. The point of interest in all of this vocational venture seems to be the element of prophecy. The scientific method is being employed in the quest to work out the theory of inherent capacities. In other words, what has been accepted as an undemonstrated thesis, a plausible theory, is now being subjected to the scientific method, and as a result of the application of this new and delicate instrument, the old philosophy of educational predestination has been revived and intensified, not on the basis of any verifiable evidence, but on the theory that these tests are bound to become more and more reliable and penetrating. The "lad o' parts" is with us again. The "weaker vessels" are to be sorted out and given a special type of education. The belief would seem to be that man *is* already, or, at all events, that on account of his inherent structure, he is forever barred from *becoming*. In effect, man is doomed either to success or to failure.

One may very properly urge the use of psychological tests for purposes of diagnosis and improvement of teaching. It is not essential that classification should be the dominant aim of tests of any sort. To hold that the purpose of education is the production of changes in individuals indicates a radical departure from the absolutist's programme. It means that improvement of power is not a function of structure, but rather a function of exertion. Under this thesis man *is* not until he *becomes*. Man's heredity is his task. The emphasis is shifted from donation to achievement. The new instrument of educational tests may enable the teacher to find out where a pupil is in a developing scheme. It will assist him in arriving at values; for no fact can be accepted in its baldness. The test is in no sense a means of determining what change may be produced under new controls. In brief, prophecy cannot be securely based upon psychological tests. They should enable us to select a desired change. The individual energizing, agonizing, working within the new conditions set up as controls for the purpose of effecting the desired change, *makes the change.* This hypothesis abandons status, and secures for education the hopeful and soundly scientific principle, to wit, *our educational hypothesis is a function of activity.*

Differentiation and Classification.—The biological principle of differentiation may now be linked up with the promising psychology of individual differences. Instead of seeking higher degrees of uniformity within any class group, it should be the aim to emphasize progress within organizing principles, and to foster developing differentiation. No two pupils may be expected to do the same amount of work, or to make

equal paces of progress. If rates of progress are in any sense determined by original nature, and conceivably such a view could be accepted as thoroughly sound, then it would seem to be perfectly clear that increasing ranges of differences should be expected in any working group.

The best time to bring together a group of pupils for the study of any subject—geometry, science, what not—is an important matter, and constitutes a real problem in itself. We are concerned at the moment with the processes of development in the class or section group on the basis of present practices in programming pupils. No matter what degree of uniformity of abilities may be assumed at the beginning of a course, an application of this functional interpretation of procedure will inevitably lead to greater and greater ranges of differences in powers.

The need of tests based upon developmental processes is evident. That is to say, tests cannot be formalized, stereotyped, and settled, as absolutes, any more than any other educational hypothesis, if we are to go forward in procedures based upon life categories.

The significance of any response cannot be determined apart from the total situation in which the item of experience occurs. Any attempt to limit education to a mere quantitative and mathematical analysis in the view that *fact* is the correlate of science must fail; nor is it enough to insist upon a view of *value* as the correlate of appreciation. The application of scientific method should serve to enable us to evaluate results with increasing accuracy of judgment and also to cultivate a certain liberal temper in appraising powers of boys and girls.

Self-Realization.—To accept the view that nothing significant in power is gained except by exertion is at least a wholesome philosophy. The attempt to modify controls for the purpose of assisting the pupil toward a sensitive responsibility in his own self-creation and self-realization is certainly no argument for a "soft" pedagogy. It puts the responsibility for progress where it belongs. The task of the school is a difficult one indeed, yet not insuperable. Some clear-cut democratic criterion is needed. May it not be that the function of the school is to surround each developing child and youth with such conditions as will enable each to become an excellent judge of *his own developing powers* and to find for himself through gradual, progressive experimentation his own opportunities, not alone in school, but also in his life-work or occupation. The responsibility for progress, development, and occupation must be assumed by the individual. The extent to which the school may be utilized in the process of assisting boys and girls to adequate self-expression and personal responsibility has hardly been realized or appreciated.

There is some considerable confusion of judgment in drawing inferences from doubtful analogy. For example, in the case of line breeding for a special quality, such as a high-milk-production herd, or a trotting stock, physical structure is differentiated and a potential quality is predictable. Improvement in special quality or power is still possible and is assured in the individual by exertion. Otherwise it is difficult to understand how any gain is made in a special trait in line breeding. To allege that variation in mental traits and capacities can be accounted for in the same way

is somewhat specious. Perhaps primitive groups could be shown to be far below modern groups in sheer mentality. That, however, is not the real issue. Our classroom groups are quite homogeneous in that the members of any given class belong to the present-day civilization. There has been, in other words, no deliberate experiment comparable to line breeding designed to produce genius in algebra, music, science, or any other line of general secondary education. It would seem logical, therefore, that we should use with great caution arguments based upon analogies from experiments which first of all deal with variation in physiological structure.

Again, what is required under an emergency programme such as war, or for that in civil-service positions, may not be applicable in an educational programme. Not only should the distinction be made between skill and the educative process (*i. e.*, between training and education), but also between the claims of immediate necessity and values dependent upon time and experimentation. The rapid mobilization of special skills is imperative whenever an emergency arises. Efficiency in factory production involves the same general principle. If the centre of gravity for youth is to be in the economic sphere, then technical efficiency must be placed above values. Human values are relegated to a subordinate rôle. If, however, the centre of gravity of the life of youth is to be found in an educational sphere, we shall not be driven to the necessity of classification and a discovery of "innate" or "resident" capacities. We shall have time for experimentation. The candidate for personality will be given a chance to grow. His development will not

be cut off by early vocational placement. What is revealed through tests as a weakness may be accepted as an evidence of immaturity. In education infants are to be nurtured. We find in the college individuals short of full-orbed development. The value of psychological tests is inestimable in diagnosis. They should be regarded as delicate instruments for revealing symptoms both of healthy functioning and deterioration. Prediction of outcomes is the acid test in an emergency or a production programme. Prediction is not a major consideration in an educational situation. We have time for experimentation and "try-out" in the latter. Negative results are not disastrous in the educative process. The important thing is progress, growth, development—not technical efficiency.

Moreover, standards of all sorts dealing with human situations are instrumental and necessary in excluding unprepared and incompetent individuals from the enjoyment of certain privileges retained for those who have complied with the requirements of this and that institution, service, or profession. But it should be recalled that not all who comply, pass the test, or measure up will on that account prove competent in the enterprise ahead.

Tests of all sorts test about what they test. It is extremely doubtful whether or not intelligence, character, genius, "native" mentality, or potentiality is tested by materials dealing with restricted areas of academic information or social materials which are unequally shared by any group. The technic or methods by which such a fundamental quality as genius or intelligence may be *realized* may be lacking. Unless these qualities of the human find a way for expressing

themselves, they are not grown, developed, or realized.

"The written part of the examination (or test) can only deal successfully with that part of it which is destined to be forgotten as soon as it has served its purpose, and it can tell us next to nothing of what is to remain as a possession forever," says Burnet in *Higher Education and the War*, and "culture" means "*activity of thought, and receptiveness to beauty, and humane feeling*," and it exactly covers that vital part of education which cannot be tested by the ordinary written examination or test.

Frankly, the thesis defended here would operate to avoid the blight of specialization in the high school. The main lines of secondary education are conceived to be general in character. The entire body of the youth of the nation should be given solid contact with the essential modes of secondary education as a part of common-school education. The underlying principles are included within six or seven cores: English, mathematics, science (agriculture included), history (social studies), language (stenography as well as Latin), constructive arts. All normally constituted adolescents are capable of making evident progress in all of these fields. It is, in our view, absurd to allege that any boy or girl is biologically unfit to succeed in any legitimate work of any one of these six major lines of secondary education. The four fundamental social arts in early elementary education—reading, writing, arithmetic, drawing—are the basic social arts for all children. No one presumes to select those who have capacity to succeed in the use of words applied to reading. Similarly, the writer entertains the view that no pupil is inherently incapacitated to learn algebra,

shorthand, chemistry, etc., in the secondary school. It is mainly a question of assisting the pupil toward a sensitive responsibility of his own task of self-mastery.

What is recorded as failure is, on the whole, evidence of ineffective social controls and individual intellectual flabbiness, both of which may be successfully met, as a general proposition, when we square our educational philosophy with our new categories of science in terms of function, development, experiment—in brief, *the will to progress*—and then give attention to procedure values that level up to this modern philosophy of American life.

Practical Aspects of Educational Theories.—It may not smack of the cold, impersonal, objective side of science to urge the psychology of practical human relations. No father is reconciled to any classification of his progeny in the *C* group. The educator who insists that he would gladly accept the programme for his own son can insist vigorously so long as he knows his son falls in the *A* division. Self-preservation—the survival of the fittest—has always been a comfortable doctrine for those who prosper, be it remembered. The modern schoolmaster with his up-to-date devices and his I. Q.'s (Intelligence Quotients), by which pupils are sorted out and placed in their respective "exhibits," is repeating a sad chapter in the history of education. The schoolmaster is not immune from our human psychology. Let him predetermine a "mentally delayed" lad by placing him in the inferior section and it becomes exceedingly difficult to refrain from proving an *alibi* in that boy's dilemma. In fact, the boy himself is not slow in sensing his position and he too

proves an *alibi*. The schoolmaster has always been able to get just about what he expects from his pupils. The *C* pupil soon responds on the level of expectation. The absolutist readily finds material to satisfy his formula. His formula, $x + y = z$, is a ready-made scheme. His materials are fashioned to fit the formula. For the pragmatist, the humanist variety, any such formula is conceived as an hypothesis. x and y for him are naked creatures and must be reclothed with every use. The future is not closed in this latter view. There is room for experimentation, for trial and success, for tentative judging and frequent revision of opinion.

The practical side of this discussion is obvious. Hasty judgment on what a boy *is*, not *what he may become by exertion*, is a schoolmastering trait sadly overdeveloped. The wholesome philosophy of linking up a faith in developing powers with human psychology in dealing with folks is soundly based in the fundamental principles of American life. The responsibility for results is definitely shifted from absolutes, supernatural and beyond man's power to control, over to man, where it belongs. Responsibility for changing the direction of the current of life is transferred from a blind evolution, mechanically driven on to perfection, over to man made sensitive to his share in the co-operative drive to change human nature and to harness the brute forces of the cosmos in the interest of man; for we live in a world of changes and developments, not a world of absolutes. It is after all essential, yea imperative, in a real democracy to recognize the supreme worth of every individual. Each must be given a fair chance to grow; each must be taught to win by achieve-

ment freedom and power in the direction desired. The scientific method is indispensable in any sane realization of a procedure to this end. *The practical significance of having a hopeful people, confident in their ability to change the direction of forces, confident in their ability to overcome difficulties and to find a solution of their problems, can be urged with perfect scientific composure in the profession of education.*

Differentiation vs. Group Mediocrity.—By placing the emphasis upon progress through achievement the way is open for developing differentiation. The low mythology of uniformity, or of conformity or mediocrity for that, no matter on what level conceived, is no longer entertained. In the game of life there will be ample room for "each in his own tongue" and also for the genius of co-operation. We shall expect emerging qualities of leadership, courage, power, and initiative out of the striving of all with each energizing to his maximum. A recognition of superior merit is a democratic possibility even after status has disappeared in education. The spirit of good sportsmanship in athletics is illustrative of the attitude to be taken toward education without status. In the contest there is the element of winning the score; but there is also good fellowship and fair play. There is consensus of judgment and good feeling accorded the star players. And, moreover, the keenest sensing of values in a real contest falls to the one who all but wins the honors, the second man. The lowest man in the running is hardly scandalized by his position in the final score.

Democracy, rationally organized, must take into account trained and technical abilities with which the "common man," so called, has been somewhat im-

patient. Discrimination in the selection of exponents of the common good is to-day sadly neglected. It should be a matter of general knowledge that extension of privilege does not result in levelling society. On the contrary, even greater ranges of individual differences should be expected by increasing the number of those who may enter the game with a fair chance of improving power by exercise. Moreover, when every ability or potentiality is guaranteed an opportunity for full self-expression, the common elevation may be appreciably raised and also new mountain peaks discovered. Here again we have life's categories interpreted in terms of growing, changing hypotheses, not in absolutes.

Equal amounts of progress are not to be expected in any class group where every person is developing at his own best rate. One thing needed now is a general levelling-up that will insure creative thinking in American life. A general schooling short of the 6th grade is hardly adequate in coping with twentieth-century problems. There need be no anxiety concerning leadership in the adoption of an educational programme intended to secure universal secondary education. It is not important that all should succeed in the same way or to anything like the same degree in the essential principles of secondary work. The lazy fallacy that uniformity would be imposed by such an extension of privilege is a part of the low mythology of the old political notions of democracy. In the view of the thesis suggested in these remarks "Man is not created" exactly: rather, "Man creates himself by his own activity." Hence, our earlier conceptions of equality are insufficient in the new social order. In-

evitably merit earned in the sweat of man's brow must be the criterion by which to judge human values. The horizon of achievement is extended by virtue of the fact that no upper limit is set for any individual. Perhaps it will become increasingly difficult to differentiate conspicuous service as well as capacity, but one thing is pretty certain: if we can delete the ancient dogma of rights, absolute and inherent, and frankly accept a new working hypothesis, to the effect that man must be everlastingly achieving his freedom, everlastingly improving his powers by exertion, and everlastingly growing his personality, it is reasonably sound argument, it would appear, to urge that social discrimination can be cultivated and that society can be carried forward in the processes of organization toward clearer recognition of trained and technical ability in the promotion of the common good.

The institutional schoolmaster has always been resourceful in devising methods by which he could distinguish successes and failures. To be sure, he found difficulties in dealing with pupils who moved about in the twilight zone between "failing" and "passing." Often the means employed to locate the doubtful victim on one side of the academic dead-line or the other have been ridiculous. Some great man has said that he pursued the multiplication tables without overtaking them. It would no doubt be embarrassing to many a pedagogue to meet his pupils forty years after he had separated the sheep from the goats on the basis of current school standards.

Sensing a New Direction.—The shift of emphasis from the conception of successes and failures to the conception of progress and changes in human nature

in the educative process obviates the apparent necessity of making this exasperating cleavage between pupils. It could easily be shown that many pupils marked failures have made greater relative progress than others who have received the pedagogical benediction. The new school and the new teacher will be concerned less with standards and infinitely more with growth and development. The new teacher will be interested in the creation of a certain type of individual —an individual who is making progress in rational thinking and in the development of social-mindedness.

We must be prepared to meet the objection that scholarship will perish from the face of the earth if we undertake the democratic task of bringing about conditions that will make it possible for the breezes of science, art, and poetry to fan the brow of the common man. Yet "temptations to excellence" may not disappear in the new conception of the individual. We can have a large scientific faith in human nature and at the same time enhance the meaning of intrinsic scholarship. Perhaps we shall find it imperative to reconsider the elements and character of accredited forms of scholarship. In the past status has dictated the terms and conditions of scholarship. The standards have been too narrow and exclusive, if not artificial and dogmatic. It has been thought that a superior class, a chosen few only, could succeed in the "hard" studies. Somehow the defenders of the *status quo*, the absolutists in education, have arrived at the conviction that folks are doomed from the beginning to success or failure. That we still have different degrees of success no one will take issue. Up out of the striving of all will come our emerging leaderships on

the new basis of a "live-and-let-live" programme in a world of mutually shared interests. Each will still be an individualist in the best sense and withal differentiated, *i. e.*, individualized, as a social being without destroying the genius for co-operation.*

The technic is yet to be worked out. Surely the antiquated lesson-hearing school with its dogmas of acceptance must give way to the thought-provoking school with its *zest* for true living. The educational psychologist and the new teacher have a large part to play in the remaking of our schools. The new general method will no doubt find its dynamic in the spirit of science. The new culture must start with a new conception of the individual, a new faith in human nature based upon the presupposition that changes in man and society can be produced. The main preoccupation of youth, as well as children, is growth and development. By placing the centre of gravity of the life of youth in an educational sphere, rather than in the economic sphere, we shall be able to create a new and hopeful attitude toward human values and the potentialities of youth.

* For a masterly presentation of the issue of "Pedagogical Determinism; or, Democracy and the I. Q.," see Bagley, *School and Society*, April 8, 1922.

CHAPTER IX

A SHIFT OF EMPHASIS

The Task.—The supreme task of the teacher is to stimulate and guide mental life. It is idle to talk about being a student without study, without whole-hearted concentration of energy to one's work. There is no easy road to mastery. In the last analysis it must be made clear to the pupil that he is responsible for the use of his powers in a learning situation. We, as teachers, need to recognize the primacy of the living variety of experience and seek to develop an atmosphere in which each individual may rise to the full measure of his possibilities. The essential matter lies in the development of an environment in which the conscious will may be impelled to embark upon new adventures with energy and purpose. The problem is to plan and fabricate controls which grip the imagination of pupils and which evoke sincere responses. Whatever proves to be instrumental in the release of potentialities gains significance in this view.

Basis of Action.—A philosophy of education is imperative; some philosophy of life is always accepted either implicitly or explicitly. The whole educational situation is colored by the theory of mind represented or misrepresented in current discussion. The extent of corruption of youth through the spread of soft pedagogy can hardly be overestimated. The nerve of effort-making capacity is cut by a constant misrepre-

sentation of human potentiality. There is a widespread belief in the doctrine of original capacity. Many a pupil, finding difficulty in some "hard" study, is reminded that he is motor or executive minded and, on that account, unfit for the pursuit of things intellectual or abstract. Teachers and parents are prone to entertain some popular fancy about genius, talent, or native endowment. In the more or less pervasive acceptance of a kind of dogma of educational Calvinism the ideal achieving capacity suffers lamentably. It is perfectly obvious, however, that a blind faith in the ability of every individual to rise to a level of surpassing excellence is an obstacle in the development of a sound professional spirit in education. On the other hand, teachers to-day would welcome a new emphasis on determination on the part of pupils to see it through. They might well maintain that teaching is a mode of arousing boys and girls to say in countless ways *I can, I must, I will.*

Again, if the mind is simply to be trained by means of certain traditional studies, if the emphasis is placed upon a formal mechanical discipline, the tendency too frequently is to foster the memorizing school. Recitation and reiteration of accredited subject-matter may readily come to be the essential modes of expression. Or, if the mind is conceived to be a kind of receptacle to be filled with "contents" (information) or an instrument or mechanism in which certain bonds are to be fixed, the emphasis is still on the lesson-assigning and lesson-hearing school. An enormous amount of testing the retentive capacity of pupils is done. All this reflects a well-defined theory of education. The painful process of information is still

conducted with vigor and devotion under certain theories of mind-training.

A totally different approach is suggested in the view that real education begins at the point of difficulty or crisis. The problem-solving school is envisaged. The past, and by the past is meant experience in all its forms—knowledge, information, theories, principles, methods—all of these things can only furnish man's intelligence with material to organize, systematize, and order for the purpose of setting up some point of departure for the will to embark upon. To use a Dewey statement, education must deal with a continuous reconstruction of experience. There never can be too much information, too much theory, or acquaintance with "dangerous" methods, if all such experience is used as a basis for reconstruction in facing the new situation. Intelligence is, in a real sense, a lamp throwing perhaps a bit of light forward; but the *next step* for the teacher is always out on the frontier of educational civilization. Teaching is essentially an art. The conscious will equipped with scholarship, theory, experience, method (intelligence, in short), moves forward, not by chart and compass, but rather by taking the moral hazard. This is the significance of a shift of emphasis from accredited sanctions in terms of subject-matter and methods over to real boys and girls at work in a procedure in which directing action through control of environment is the primary emphasis.

Search for a Constant.—The habit of looking for some infallible, safe guide must be examined in this connection. To transfer attention to boys and girls at work means a study of human situations.

A human situation is so vast, so many-sided, so complex that no scientific solution, no group of scientific principles, is quite far-reaching enough to cover it. Such bits or aspects of it as we may abstract from the whole and consider apart are a mere inconsiderable fragment of the total issue of which the roots are in Tophet and the branches among the stars.

What we abstract in some fragmentary aspect is thrown back as a bit of new leaven into the boiling ferment of mysterious forces that are at work.

A pleasing fancy, too long indulged, bids us hope that the ebullition will cease the instant that science is cast on the flood. But experience teaches that science, thus introduced, joins the turmoil instead of calming it, or gives new vigor to the gods who trouble the waters and raise the wind.*

Science in that sense can never capture the essential fact of life. May we not frankly recognize the fact that a science of teaching on those terms is impossible? Neither history, regarded as a means of predicting the future on the basis of repetition of events, nor science, as applied to inanimate things or to forces undifferentiated by conscious will, can be relied upon in dealing with those shy facts in human situations. The notion is deeply rooted that somehow the secret which holds the solution to human reaction may be disclosed. The search for a constant is a diligent one, in spite of the fact that the self-conscious will escapes formulas and overflows definitions. This is one side of the shield.

There is another emphasis in modern science that throws light on our quest. Vital history, as well as modern science, teaches us that we live in a world of changes and development, not in a world of absolutes.

Change, in short, is no longer looked upon as a fall from grace, as a lapse from reality, or a sign of imperfection of Being. Mod-

* Jacks, L. P., *Alchemy of Thought*, p. 239.

ern science no longer tries to find some fixed form or essence behind each process of change. Rather, the experimental method tries to break down apparent fixities and to induce changes. The form that remains unchanged to sense, the form of seed or tree, is regarded not as the key to knowledge of the thing, but as a wall, an obstruction to be broken down. Consequently the scientific man experiments with this and that agency applied to this and that condition until something begins to happen, until, as we say, there is something doing. He assumes that there is change going on all the time, that there is movement within each thing in seeming repose, and that since the process is veiled from perception the way to know it is to bring the thing into novel circumstances until changes become evident. In short, the thing which is to be accepted and paid heed to is not what is originally given, but that which emerges after the thing has been set under a great variety of circumstances in order to see how it behaves.*

If this is a fair expression of the scientific temper, then we shall have no difficulty in conceiving the possibility of applying the spirit of modern science to every phase of modern life. The artist works along this line. He sets up his ideal, his goal, or may we not say some hypothesis, examines his data, tests his procedure by the effects of his action, and redefines his ideal in terms of his work. The experimental method is rich in suggestion and possibility for the emancipated teacher.

A curious contempt for individuality has developed in recent years. The supervisor, not infrequently, looks upon the teacher as a part of the system, employed to carry out orders from above. Undue importance is attached to covering the ground and making sure that everybody in grade so and so shall have arrived on schedule time in a given course of instruc-

* Dewey, *Reconstruction in Philosophy*, p. 113.

tion at a predetermined goal. It is all a part of an emphasis upon the ideal of organization. Life may be sacrificed to the majesty of plan and precision even in our form of social organization. The excuse is offered that our teachers are without experience and that they must be given explicit direction in great detail. It is another expression of status and a mechanical theory of education. May we not insist again that it is only as the *teacher actually reconstructs* all external orders, courses of study, methods handed down, that any vital teaching becomes possible? That is precisely what the successful teacher has always done. He must soak the conclusions, the methods, the information of others in the dye-vat of his own mental laboratory, if he would teach in any true sense. Moreover, the school conceived as a laboratory provides, in itself, an opportunity for self-expression of both teacher and pupils. It is not enough to say that our teachers could be trusted with a large measure of initiative and personal responsibility, if they were only equal to the task; the situation is not improved by denying or limiting the opportunity for the exercise of responsible freedom. Directing study requires it in increasing measure. Arbitrary and dogmatic rules of guidance in a human situation cannot be laid down and carried out in any impersonal manner.

Two views of science have been sharply contrasted. The exact, quantitative, objective, verifiable, self-eliminating science may be employed, now and again, for the purpose of raising problems for further investigation. In so far as careful study is provoked this type of analysis is wholly legitimate. It does not furnish a constant which enables one to make pre-

diction in meeting new human situations. The other conception of science, the experimental method of modern science, is accepted as the basis for a new general method. The teacher is dealing with changes in boys and girls. Directing study aims to introduce controls and to bring about novel circumstances in order that we may study behavior and see how learners react.

Purpose of a Formula in the Educative Process.—The statistical method, the examination, the standard test, or any other form of tool used in diagnosis should be conceived, not as a finality, but as a means in clarifying some aspect of a situation prior to raising productive questions about the thing examined. In applying the methods of exact science, we need to be reminded that a popular fallacy prevails concerning the certainties of statements backed up by cold figures. Statisticians are not always right simply because their figures are correct. What the teacher insists upon knowing is whether the figures are being rightly applied to the argument. The human situation is extraordinarily complex and is covered by no definition or formula.

Furthermore, these external methods and ready-made devices should be employed, not once, but many times. Longer periods of time ought to be laid out within which a given test or tool may be utilized in the examination of the data to which it is applied. The habit of drawing inferences from a single application of some method or test is a species of modern dogmatism parading in the "livery of science." No form of thinking requires more careful checking upon inferences than the deductions which are made upon the

application of the tools of science to the solution of human situations.

If some accurate record of a thoroughgoing test of the ability or intelligence of 100 children in some school year, the 3d grade, say, or 9th grade, could be made, and then an accurate history of these same individuals could be made available for some years thereafter, the reliability of the tests themselves could be examined with a high degree of scientific accuracy. And again, if a group of children could be selected and rated as to their capacities and then subjected to a rigorous and sympathetic type of education under deliberate controls designed to release every potentiality of every individual of the group, would it not be possible to conceive outcomes of a character enormously different from the customary remarks one hears about young people *in the making* and what they may and may not be good for? All of this, to be sure, is hypothetical and perhaps too remote for practical consideration. The complexity of the problem, however, is suggested. It is extremely difficult to forecast what any normally constituted child may achieve under conditions conducive to growth and self-expression.

In Table I is represented a distribution scheme to indicate the positions pupils take in two successive situations. Each pupil in the study is designated by a number.

Reading from left to right, *90* is in group *A*, *12* in group *B*, etc.

Reading from top down, *90* is in the third quartile, *12* in the second, etc.

A, *B*, *C* stand for a division of pupils in one set of

TABLE I

	1	2	3	4
A	1, 20, 3 26, 75, 85 2, 31, 56 27, 82, 60 33, 52, 63 etc.	5, 17, 9 56, 45 37, 50 30 etc.	90, 24 64, 34 etc.	13
B	19, 57, 10 etc.	6, 7, 18 38, 29, 14 70, 75, 86 12 etc.	29, 48 etc.	55, 61 etc.
C	23, 47, 59 etc.	95, 15 43, 35, 91 etc.	99, 86 21, 32, 40 88, 101 95, 77, 73 etc.	103, 16 etc.

circumstances—a semester, year, grade, or course of instruction.

1, 2, 3, 4 stand for a division of the same pupils in a subsequent situation in which comparisons are made.

A and 1 are the highest 3d and 4th respectively in the divisions made.

A descriptive account showing a possible use of this scheme of making comparisons follows:

An example of what seemed to be a fruitful form of study based upon a statistical inquiry consisted in an examination, for three consecutive years, of the school marks which pupils in a large city made in the 8th grade and in the first year of the high school. Marks were distributed in a percentage array and given a tertile division for the 8th grade both for the general

average and for particular studies in the case of those closely related in this two-year period. Each ward school was listed separately and the pupils were accounted for in the 9th grade. For the high school the marks were distributed into three pass marks (1, 2, 3) and a failure mark (4). A chart was used indicating the position the pupil held in the 8th grade and the position he earned in the 9th grade. Each pupil was designated by a number. The chart contained twelve squares, three one way, four the other. If a pupil was found in the highest third of the 8th grade, and also in the group of those passing with the highest mark in the 9th grade, there was a high degree of correlation, likewise for the pupil in the second tertile in the 8th grade who fell into the second pass group in the 9th grade. If the numbers banked above the diagonal of squares containing "perfect" correlations or below, it indicated clearly the relative positions which the pupils were taking. Those pupils who gained or lost one or more positions could be readily located.

This study, when first presented to some thirty ward-school principals and supervisors, provoked interesting comment. All sorts of explanations were offered in the case of the desirable and undesirable positions in the chart. Ward school *A*, it was confidently asserted, always sent to the high school bright pupils, well prepared. "Nobody ever got on well from school *M*." "A poor showing from school *X* was due to lack of city supervision," etc. The next year the same type of study was made. School *A* did not make as good a showing as school *M*. School *X* did remarkably well. The same principals and supervisors were not nearly so sure of their footing as they were the previous

year. When the third year's study was presented, no one in the group was bold enough to venture an opinion in explanation of the results.

This type of continuous analysis by a statistical method seemed to be productive in that city. It afforded a basis for careful investigation of the facts and served to develop a wholesome tolerance. It gave some school principals a basis for new courage and enthusiasm when it was revealed to the entire supervisory staff that mere opinion and uncritical tradition could not be trusted. *The value of the study was not found in the facts disclosed, but rather in the development of new attitudes and new methods in supervision as well as in teaching.* It was not maintained by the high school that a particular ward school was doing poor work simply because a low rating was made by its pupils in a single year. There was cultivated the disposition to wait on experiment and new data. By such a continuous study, hinged about a very simple bit of statistical analysis, the fact of a considerable mobility of position among the schools was noted. No single constant was revealed such as "School *A* always sends on to the high school pupils of high ability and splendid preparation."

The tool, the formula of science, the x plus y equals z, is in constant need of new clothes. The *constant* in the formula is its persistent nakedness and insistent demand for new apparel for every occasion. *The formula must be reclothed with every use.* The refinement of technic calls for a modification of the formula itself. That is, by the way, the issue of evolutionism *vs.* absolutism. The real question has turned upon the evolution of form or type. With the scientific tool

the scientific mind is able to attack the process veiled from perception, and to abstract some aspect of the situation, thereby preparing the way for raising all sorts of questions concerning the nature of the thing under examination. What is disclosed calls for further inquiry. It is rather difficult to consider the matter closed as long as life is there.

The tools of the exact sciences are to be used in the analysis of conditions. The prospector in his search for precious ores uses his tools in this and that situation. He must examine the results of his efforts. Not all the "diggings" yield gold. Many a lead is abandoned after patient investigation. There is no guaranty of certitude merely in the fact that reliable tools are employed.

Scientific Humanism.—The practice of medicine furnishes the educator a fruitful analogy. The physician manages his case by employing both science and art. He has at his command the tools of modern medical science. The physician is, first of all, a diagnostician. He examines, analyzes, tests for certain reactions, and then prescribes treatment. The development of new symptoms calls for extended analysis of conditions and a modification of treatment; perhaps a consulting expert is called in. Now and again there is a differentiation of functions. One physician becomes a skilled diagnostician. The treatment is turned over to a group of doctors and nurses skilled in their special work. It is significant to the educator to note the fact that the physician adopts the experimental method. He modifies the treatment in terms of the reaction of his patient. There is no disposition to dismiss the case if recovery is not evident upon first treat-

ment. The patient is not reminded that he is hopeless nor made to feel that he cannot recover. Responsibility is assumed. If a serious condition develops, the physician is there; no spurious excuses are offered. Out of a spirit of service, essentially that, he will stay with his case even unto death. There is in all this a beautiful blending of science and humanism.

Moreover, while it may be misleading to try to estimate the relative significance of the science and art of medical practice in general, yet it is, perhaps, a suggestive departure for educational practice. It is no depreciation of the science of medicine to discover that in the practice of medicine it is only about 10 per cent science and 90 per cent art. The part that is science is tremendously significant and far-reaching. The art side is likewise significant. It has been urged that certain forms of treatment by means of electrical appliances are of no avail unless the patient *wants* to recover, and with the desire to recover an active effort to respond to treatment is imperative. When it comes to the case of John Smith sick as to scarlet fever, the task of medicine at that juncture is not so much to find a cure for scarlet fever as it is to cure this particular individual sick as to this particular ailment. The field of preventive medicine is fully recognized. There may be demonstrable scientific procedures in education of comparable sort. It would be absurd to disregard any fairly well-established procedure merely for the sake of novelty.

The inferences are numerous from the analogy of medicine. We frequently hear it said, "Now that education is about to become scientific," as medicine is, etc. And it is a tremendously significant factor in

educational redirection if it could be demonstrated that even 5 per cent or 1 per cent of our task could be approached with definite and reliable scientific tools. We should then have a delicate instrument by which analysis and diagnosis could be initiated and by which problems could be disclosed and defined for further investigation. The human situation would still call for a vast amount of art. It is not to be expected that the whole of life, or a considerable part of life, will ever be reduced to a quantitative, self-eliminating basis.

If we concede, however, the far-reaching importance of the effect of science upon medicine, even though there are still vast areas untouched and unconquered (the respiratory diseases, for example), we shall be in a position to appreciate the significance of the beginnings made in scientific education, no matter how meagre they may be. The lesson that we ought to learn is perfectly clear. The new teacher will be less a trainer of the mind and far more a diagnostician and a director. He will be prepared to make such analysis as is possible with our modern tools. He will examine, test by controlled experiment, prescribe treatment, and by careful checking of results he will not fail to modify treatment in terms of the reaction of *his cases*. He will be alert to changing conditions, to new symptoms, and improvement. A faithful application of the experimental method would obviate the exasperating practice of shifting responsibility upon the institution from which the pupils came. The physician-minded teacher and administrator will be concerned mainly with the procedure employed in handling the case under their treatment. It will not be so easy to shift

the burden of responsibility when this conception prevails. If the student is not on the road to recovery, a fresh analysis of the case may call stressfully for a modification of the treatment. Until the teacher and the institution have carried out both analysis of conditions and reasonable modifications of treatment, it is hazardous to pronounce final judgment upon the capacity of pupils in difficulty.

Individuality and Common Interests.—The claims of individuality within the bonds of fellowship and the release of potentialities may be regarded as the supreme task of education. A proper emphasis on the social side of education obviates the fallacy of complete isolation of individual cases in teaching—a practice that would be uneconomical if not prohibitive. The class group must be retained in our schools. The problem of regimentation is becoming more complex with the increasing numbers of pupils in our higher grades. A recognition of the social principle in procedure values may enable the school to deal with its problem of numbers more effectively than is the case in conventional practice and, at the same time, make provision for the release of potentiality. These two objectives imply a co-operative emphasis upon the common elements (principles, as we have seen) and also a clear recognition of individual power and capacity within these general organizing principles.

The central fact of life itself, the fact of a vital impulse to grow, furnishes the teacher a common integrating and organizing principle upon which to proceed in the development of conditions designed to foster the full expression of each individual in the group. Individual differences are not the dominant fact in

any living form—plant, animal, or human being. The essential phenomenon is life itself, with tendencies and general habits working out in the direction of self-fulfilment and self-effectuation. The uniqueness of individuality may be but a small fraction of the total issue of one's life, and yet just that element which gives meaning and significance to the whole—the leaven, so to speak, in the total mass. To be able to recognize the common fact of life as the core and focus of our collective efforts and at the same time to recognize and appreciate the significance of that differentiating element of individuality—that particular factor of distinguishing character in each person—these two ways of looking at the teaching situation are deemed essential in approaching the problem of directing study.

For example, one pupil in a class in English may express himself in excellent terms on the topic of "wireless telegraphy," another on the "automobile," another on "The Village Blacksmith," another on "Balanced Ration," etc. Uniformity either in material or in response is clearly secondary. The essential matter is expression of ideas in good form. The particular type of interest in this situation is utilized as a means and not an end in the accomplishment of the major purpose of the exercise or project. It is important to keep in mind a practical integration of means and ends. The formalist is in constant danger of becoming indolent in the use of ready-made and fully accredited sanctions. The inevitable tendency in such emphasis is materialism and a mechanical routine. On the other hand, a disregard of the means of education leads to a spurious sentimentalism. Ends

and ideals considered alone, divorced from the practical means by which they are to be attained, have controlled educational practice when scientific method has been disparaged.

Individual differences are often unduly exaggerated in the conventional schoolroom procedure and also in the inferences drawn from the results of tests of various sorts. The case of science as a factor in the practice of medicine is suggestive here. The far-reaching significance of the small amount of science in any field consists mainly in the fact that the total issue is viewed in a vitally different way on account of the vast array of new problems raised by the apparently meagre amount of actual science employed. So it is in the matter of individual differences. The small amount of actual difference in comparison with the whole of one's expression or life is vitally significant just because an analysis of that difference discloses to the student of education a productive line of experimentation for affecting the character of the total results in the educative process. The difficulty with methods of uniformity is the fact that "that something" which is capable of acting as a leaven of the whole mass is inadequately stressed. We may call that leaven the spark or uniqueness of individuality. Too often a devotion to the machinery of education leads to a blind acceptance of the philosophy expressed by Mr. Dooley: "If ye disciver a hivenly spark, water it, water it."

An examination, disclosing marks all the way from 20 per cent or less up to 100 per cent, is not a true basis for inference that the pupils examined differ by so much in capacity or in original powers *in toto*. One

pupil may or may not be three times as capable as another in any original or developmental sense. The numerical differences tend to distort the real differences. A test of the more modern type likewise discloses differences ranging in the intelligence quotient from, say, 70 to 150 in a given group. Such a scale expresses relative differences. It is true that the numerical symbols attached to the results indicate remarkable differences. Again, it is well to consider the total issue and the relation which any abstracted aspect of life may bear to the whole of it. The actual difference in that small margin of differences in originality may be greater or less than is indicated in the numerical means employed to express our thinking about human situations.

Teachers who deal with concrete human material fully appreciate the inertness of some individuals under uniformity of treatment. If the "hivenly spark" was ever present, it at least seems never to have stirred some bodies to intellectual and moral awakening. There is a disposition, now and again, to believe that some stolid masses have never had that bit of leaven to stir to activity. All this may be due to circumstance; it may be accounted for by original nature. The patent fact is that these impossible individuals have in a great many instances surprised the schoolmaster and the critic by waking up later to the fine points of the game—by making what the world in general calls a success. It is not presumed that any specific is to be found in directing study that will enable teachers to overcome all our present defects. It is, however, logically possible that a greater emphasis laid on self-activity, and less on formalism, may be

the means of releasing potentialities more widely than has been evident in the recitation system. A change in circumstances so simple as that of having pupils work in partnerships at the board rather than to require them to sit in their assigned pews for an hour in recitation, explanation, and in paying attention may serve to indicate a departure in the new direction. A big growing boy of sixteen or eighteen with an enormous capacity for the consumption of food is not adapted to the requirements of passivity so often superimposed by the methods of our school system. He may be reduced to a condition of vegetating. Any one who has tried the experiment of partnership teaching with such boys can testify to marked changes in them. They may be unable in the passive or inactive physical mood to respond with any degree of intelligence or excellence, whereas, by the more active requirements of the various forms of partnership work, they may respond surprisingly well even on a warm spring-day afternoon in a class period of sixty to seventy minutes. The same proposition applies with equal force to all members of a working class group.

Again, it is urged that the search for a constant, a final category in which to classify our pupils, does not constitute a real problem for the teacher. The experimental method with physician-minded teachers is a promising departure and it lies at the very heart of directing study. If the pupil fails to respond to one kind of treatment, the urgent demand of the new procedure is to analyze, examine, diagnose the case and modify the treatment in terms of the reactions detected, and to go forward with courage in such redirection of practice as conditions seem to warrant. The

modifications will appear within those narrow margins of individuality rather than in the main body of organizing principles. In other words, the problem of directing study lies primarily in the zone of activities which are directly concerned with points of uniqueness of personality. It is a matter of getting at that leavening principle in each individual, assured that if it is somehow applied in each individual in his own best mode of excellence the work will be done. Or to use another figure: the problem of directing study lies in the many-sided ways of assisting learners in getting and keeping the belts on their own generators. When the powers of pupils are geared up for work, the way to vital education is open. There is no universal panacea in this matter. The old way of urging boys to apply themselves with due diligence will be employed. The importance of that "heave of the will" is not to be neglected. What will be avoided is sole reliance upon a mere hortatory type of classroom ethics and a disposition to regard intellectual interests as something inherited or dependent upon natural selection. Conditions of learning and mastery should receive constant attention in the new procedure. No one is to be put aside or held back because of inequalities in desirable habits of study and achievements. Directing study is to be approached in a liberal, experimental attitude of mind. Many good and effective ways will be employed by the teacher who has become a diagnostician —one who analyzes conditions, and develops skill as a director of activities.

A Lesson from the Old Rural School.—The problem of directing study is many-sided. If the unique qualities of personality are to be recognized in our pupils,

it follows that the teacher must develop unusual administrative and managerial capacity. It is a new challenge to study and manage individuals in a working group of some thirty pupils. Directing activity calls for alertness, resourcefulness, initiative, and mastery. One must be a teacher, not of a set lesson with its boundaries fixed, but a teacher of the subject in this procedure, as well as an expert diagnostician and an efficient director.

The old-fashioned rural school, at its best, exhibited some meritorious qualities which may serve to suggest points of departure for our procedure. No brief is held for that outworn yet quite persistent and pervasive institution. One who was schooled there and has taught in such a school is vividly aware of the problem of managing the proverbial thirty-three classes a day. The little tots in the *primer* class demand attention at this moment; the big boys and girls, sixteen to twenty-one, are there as well as all the groups between these two extremes in the scale. The teacher had to be alert to individual differences and to marked ranges of advancement and achievement. One had to teach the simple number combinations up to Ray's *Higher Arithmetic* or perhaps *Algebra*, all in a day's work. We used to have a book on *Intellectual Arithmetic*—problems to be done mentally, that is, without slate and pencil or blackboard. The beginners were struggling with their words *cat*, *dog*, *run*, and *new* and *sled*, etc., the advanced classes were exposed to fragments of the masterpieces in such historic books as *McGuffey's Readers*. Here were forty to sixty pupils in an ungraded room and one schoolmaster. That was a real job. There was, perforce, much that had

to do with keeping school and hearing the lessons said. It was a busy place and there was little there to do with. It was book learning and often essentially a memorizing school.

With all the disadvantages inherent in this old school, some elements of strength may be mentioned.

The graded system directs attention to group mediocrity. There is no opportunity for direct comparisons of advancement and achievement. The pupil in the 5th grade, for example, is not reminded in explicit terms or by direct observation of his status with respect to what he might have been able to do in the 1st or 3d grade, nor is he directly aware of what lies ahead. The graded system presents a more or less closed or shut-in view of the position of the pupil in the educational ladder, in so far as the pupil himself is concerned. The old school, meagre and ineffective as it was, offered the pupil, at least, a means of locating himself in the scale. There were concrete forms of experience that enabled the child in the earlier years to look upon those (to him) intellectual giants in the advanced classes who could spell big words with comparative ease and recite generous portions from the book. On the other hand, those in the more advanced classes could look back upon the lower classes, gaining thereby some notion of their own progress. In view of the fact that this type of school was impoverished, lacking in library and equipment, a shocking amount of time was spent in listening to each other's performances. There was offered opportunity, again and again, for vicarious reviews. No doubt some information became a permanent possession of those pupils exposed, as they were, repeatedly to this pro-

cedure. It may account for the notion that pupils in the old school were better grounded in the rudiments of learning than the more fortunate children of to-day in the well-equipped graded school. There is no valid evidence, however, that they were better equipped in this respect, and, moreover, there are other values and outcomes to be considered apart from a limited capacity to retain a few fundamental facts of knowledge.

The particular lesson to be gained from the ungraded school is the range of responsibilities of the teacher. He was compelled to adapt his teaching, daily, to varying needs and circumstances. If mathematics, it required of him appreciation of the learner's powers in the comprehension of simple number combination on up through fractions, and problems in mensuration. So it was in every main department of the curriculum. Adaptability, versatility, administrative acumen, and appreciative understanding of all sorts of capacity and stages of advancement were necessary qualities for successful performance in the one-room rural school. Individual needs were constantly brought to the fore. The pupil really became the educative unit. Small groups of two to six or eight formed the class unit in so far as class sections were possible. It is interesting to note the fact that in the earlier day, before the rural school took on city airs in elaborate gradations and promotional schemes, the pupil was given many opportunities to compete on the open basis of demonstrated ability and merit. In the spelling-bee and similar contests the youngster of whatever age won his position in the group. No one was held back for the superficial reason that he must spend a certain

number of years in attaining some predetermined goal. The pupil in reading and arithmetic, all studies for that, was permitted to associate himself with those of equal attainment, no matter what the differences might be in age and years of schooling. In contrast, the teacher of a given grade in a city school system or the teacher of one class section at a time would have little appreciation of the problems of the country school-teacher in the one-room school. Those who have had experience there know that it was a vital human situation, a big family with many difficult problems constantly challenging the teacher.

Some experience of that sort prepares one for a better conception of the departure of directing study in terms of individual needs with a deliberate emphasis on working toward unity and co-ordinating ideals through the self-activity of all. The graded-school system lends itself readily to all the disadvantages of group mediocrity. The tendency too frequently is to regard a given group or grade as possessing equal abilities. In fact, any selected group in a given grade is likely to be conceived as being a uniform group. It is difficult to start with the individual. The solution does not lie in a return to the ungraded rural-school type. The purpose of this digression is merely to set forth a possible illustration which may serve to make vivid the responsibility of the teacher who attempts to start with the individual as the educative unit instead of the class.

Again, it should be noted that the teacher in a given grade or a teacher of a special subject in a particular year is not reminded constantly of the varying degrees of capacity and achievement of pupils in any prin-

ciple which underlies a big realization or subject. The tendency to shift responsibility is well-nigh universal. The teacher who sees his particular sector of interests narrowly can blame to his heart's content the teacher in the preceding grade or in a neighboring department. The rural school-teacher could also indulge in the luxury of heaping opprobrium on his predecessor, but he, at least, had to face the results of his own teaching in so far as the effects of his work in one subject were transferred to another. How to obviate the separation which is everywhere found in our graded system and to build up organic relations constitutes a real problem. The practice of disposing of dabs of information through the processes of lesson assigning, lesson hearing, review, and examination needs constant and critical analysis. The old-fashioned school affords just a suggestion, merely, not a specific at all.

Perhaps we shall have to bring about a new emphasis upon soundly organizing principles which must be made to run through years of learning by and through which brute facts of information, problems of all sorts, and data of great variety are to be conceived. The practice of covering the ground is certainly not acceptable or final. The pupil who resorts to the excuse that he has had this and that in some previous year or course and is therefore not expected to know it now indicates, in a way, a questionable emphasis. Until facts are used in the exemplification of abiding principles, they will escape us no matter how effective mechanical drill may be. A real progression within clearly defined organizing principles is yet to be realized in practically all upper-grade and high-school subjects. It is not at all difficult to understand why

pupils dismiss what they have half learned or only partially mastered. The continuing principles, binding together a sequence of courses of instruction in a major field of education, are hazy at best, and hardly ever made explicit for the learner. He may not be aware that he has done more than cover so many pages of this and that with rapid progress in disposing of sections of the courses he is pursuing. The spirit of a subject is too seldom incorporated into one's living. The high-school pupil, as a rule, disposes of his books after passing the course. He rarely takes up his algebra, Latin, or "required readings" just to see what he can do with them after his marks in the courses are recorded.

It should not be assumed that pupils are equipped with readily transferable qualities. One of the problems of teaching is to get pupils to use what they know and to rise to their possibilities. For example, slovenly habits of English may be partially overcome by a cooperative drive for good form in any subject—science, history, Latin. Clear thinking and effective performance in any course require good English; in fact, mathematics (or any other subject) in which shoddy expression is tolerated is shoddy mathematics. The task confronting every teacher is essentially that of assisting boys and girls in the adventure of thinking clearly and fully the work in hand. When there is a whole-hearted concentration of energy in the challenge, a full and free release of one's powers in the effort to achieve results with some sense of mastery, education is assuredly going on.

Self-Expression.—Educators who are Exponents of self-activity are frequently misunderstood. Eagerness

to emphasize the creative activities of life may account for an apparent lack of interest in routine work. There are educators who would devote the period of elementary and secondary education to assimilative activities, the theory being that productive scholarship and creative thinking are to be postponed to a later time in higher education. On the side of method and discipline the formalist would urge a more or less repressive type of school in which docility and the dogma of acceptance prevail. The extreme form of training (not education) is illustrated in the Prussian schoolmaster who bids his pupils follow him, saying: "Listen to me so that you can tell me back what I am telling you." Certainly by the time the high school is reached the American teacher is ready to begin to say to his pupils: "Now think clearly, honestly, fairly, resolutely, modestly, and do not fear to stand by your conclusions."

Two types of activities should be recognized and harmonized—the conservative and the creative. In the earlier years the former, no doubt, predominate. Some organic and functional integration of these activities is urged for the adolescent. Self-expression is not limited to the latter. The child holds tenaciously to his possessions. He brooks no change in the stories he has learned. He repeats again and again the words, the tables, the lines, the information he learns in the fundamental social arts in his school. By repetition he gains a mastery of his world. It is supererogation to add that all this vigorous life in the conservative activities is a genuine form of self-expression.

The old-fashioned school, often repressive, carried the emphasis on the routine tendency throughout its curriculum. Dates in history, grammatical paradigms,

formulas, and rules were mechanically learned and repeated over and over until they could be recited verbatim. They were not always used as a means of punctuating the thinking process which they were meant to serve. Much useful general information, however, was acquired in this way. The old sing-song geography lessons with a monotonous "Maine, Augusta on the Kennebec; Vermont, Montpelier on the Onion," etc., were effective in building in some nervous systems bonds that made it possible to keep Harrisburg in Pennsylvania and Helena in Montana. The reaction should be directed against the unintelligent practices of former days, not against the acquisition of even larger funds of useful information than the old school provided. The sane advocates of self-activity do not taboo memorizing dates in history if they are used to support a body of historical information and ideas that would be vague without them. By the same token, a mastery of algebraic manipulation should subserve the needs of mathematical thought. It is a strange doctrine indeed and a gratuitous misapprehension of self-expression to suppose that facts and exact knowledge are non-essentials in the creative activities of education.

If the old school devoted its energies too exclusively to mechanical drill and mere memory work, may it not be barely possible that some modern schools are in danger of dismissing too readily just that emphasis which characterized the school of the earlier day and thereby miss two goals instead of hitting one at least? In our zeal to teach pupils to think we ought to be very sure that they do it. The test of thinking is by no means a simple one. The capacity to use facts, data,

information in the solution of a problem is not always easily detected and appraised. It has always been comparatively easy to find out whether one knows a thing. The answer can usually be set over against a copy or pattern. This is especially true in memoriter forms of training. Unless there is evidence of creative activity apart from and perhaps in addition to the conservative forms of testing, what is called self-expression needs to be constantly challenged. Suffice it to say that directing activity to creative ends requires keener insight and higher art and much harder work than hearing lessons said. Self-activity by no means implies a disregard of accredited knowledge. Self-expression may be promoted in the conservative activities, but it would be a meagre education that failed to equip our high-school boys and girls through creative activities for a changing world. An attempt will be made in the development of directing study (activity) to work out an integrating and functional relation between authority and initiative.

The Individual and Uniformity.—The doctrine of uniformity has accentuated the notion of minimum essentials of subject-matter (content). Each course of instruction is conceived to contain an irreducible or an inescapable minimum. All the pupils of a given class are expected to master to some extent, at least, the prescribed work of the course. The tendency is to strike an average body of accredited materials of instruction and to institute some methodology that will insure a high percentage of successes in this minimum content. The question arises in this practice: "For whom is the minimum prescribed?" Certainly the "average" pupil is a myth. Logically it would

appear that each pupil should be given his particular minimum, if any attempt is made to adjust subject-matter to individual needs and capacity. A programme of individual adjustment in terms of content of subject-matter seems utterly hopeless, if not insuperable. Moreover, the practice of trying to fit all members of a class group to a Procrustean curriculum is becoming increasingly unsatisfactory with the progress which is being made in the study and appreciation of individual differences. After working into a course or a challenge, it would seem to be desirable to select a certain body of material in which real mastery may be relentlessly insisted upon. Perhaps such material worked into first by the whole class by individual and collective effort might be regarded an essential for certain pupils in the group who find it impossible, apparently, to accomplish more than that amount.

The discussion in the preceding chapters raises very definitely the problem of making adequate provision for the uniqueness of the individual within our ordinary classroom organization. The individual, rather than the class, is the educative unit in this new approach. Instead of starting with the class as the unit and seeking ways for the self-expression of each individual, we start with the individual and seek to find ways of co-ordinating and unifying our ideals in and through progressive and responsible forms of self-activity.

The pupils of high possibility should be given every opportunity for the release of their potentialities. Enthusiasm for directing study grows out of the proposition that it may prove to be a productive procedure to this end. The elimination of waste, useless routine,

and gratuitous explanation and delineation of the obvious frees energy for valuable work. There is no time wasted in trying to find out by futile *recitation methods whether the pupils know what the teacher is perfectly sure they do not know.* If the pupils of exceptional capacity are stimulated to work up to their maximum power, the procedure in which that occurs is highly commendable. The practical situations in the vast majority of cases make it impossible to work out a programme of segregation and congregation of pupils of ability. In the main, pupils of wide ranges of ability must be educated in the class group. Administrative difficulties in the plan of bringing together pupils of *alleged equalities* are insuperable. It is not to be contended that no failures will appear in this new procedure. It may be urged, however, that even the business of taking care of pupils failing may become more intelligent than usually happens in the recitation system. In making the best possible provision for the development of the full measure of possibility of every pupil, those individuals of splendid promise should be given every conceivable opportunity for progress commensurate with their developing powers. It is for this reason that we are urging that no arbitrary or suggestive limitations be set up such as ready-made and predetermining minimum essentials of content. Some broadly defined and perhaps delimited field of principles may be set forth for given courses. Principles, however, are indeterminate; mastery of them is only relative at best. Yet it is entirely valid and altogether valuable to work toward a real mastery of certain materials designed to illustrate these principles. The practice of passing pupils on a mark of 70 or 75 pro-

motes half-learning or even less. At all events, mastery in any real sense is not achieved. By insisting that a mark below 90, say, shall not be acceptable in the material selected from time to time for mastery will produce a new sensation among the careless pupils and the intellectual loafers. Such a plan allows 10 per cent margin for human frailties and obviates the perfection standard that seems to be persistently associated with 100 per cent. To lay out as the class proceeds into a new challenge certain specific material for mastery, and then to hold to some such standard as suggested above, might serve to promote a keener intellectual interest than usually occurs. Much depends upon what is comprehended within the 10 per cent margin. Clerical errors, some important elements overlooked in proof-reading, and perhaps the omission of the "sacred comma," are suggestive types of the human frailties to be considered in estimating or rating such performances as are contemplated in this test for mastery. Even this check need not apply to all members of a class section or group. As noted above, we may devise such flexible standards as the new situation warrants. Perhaps three or four or more of a given class may be discovered in the journey who are able to master only a limited amount of material as a basis upon which the lowest passing mark of the school is given. It would be a wholesome practice to insist with relentless vigor that a mastery of something shall really be had. The highest emerging third or fourth of a working group are far beyond any such prescribed materials. They should not be tempted to believe that satisfaction of such formal requirements is at all adequate. All of this is an adventure in the quest of

a procedure that will furnish incentives for the capable to make such progress as lies within their powers. For the alert teacher who is always human (and rarely a pedagogue) there is an alluring opportunity for splendid guidance in the field of *prescribed temptations* for those boys and girls who gain a real sense of power and mastery. Few *potential students* are worked to death; they are often bored to death.

In developing a procedure based upon differentials on a sliding scale any diagnostic means that will enable teachers to economize time and energy should be freely employed. The standard test may be used in this connection to splendid advantage. It ought to be possible to find out the potential capacity of pupils. One who makes a high score should be induced to achieve results far in excess of one who is rated low. It should become a matter of school ethics that those pupils who are able to do excellent work should attain the full measure of their possibilities. There is too much energizing below one's best. The pupil with a low index in any valid test may not be expected to accomplish what others in his class may. Rigid and arbitrary standards will have no unvarying validity in a procedure interpreted in terms of individual powers. Energy will not be wasted in futile attempts to bring the *D* pupil (so called) up to the standard which the *A* pupil ought to maintain even in the same course of instruction. All such judgments of pupils' capacities should be held in tentative form. *The danger lies in sticking labels on boys and girls and thus be content with this as a final judgment in the case of the pupils with a low index.* In all attempts to classify individuals a significant trait of the competent teacher

will be a real capacity for revision of opinion. No static conception of capacity or power is adequate in the experiment of educating developing human beings. A new and fresh analysis of the case is constantly demanded. In the suggestion, above, no pupil is permanently classified and held to be unable to rise above a mastery of the least acceptable body of material. The way should be left open for *trial and success*. One who fails under one set of conditions may start on the road to recovery in a new situation. The weighing-pan for the child is not a proper instrument with which to feed the growing youngster. With this procedure in mind no upper limit is set at any time for any pupil. The indeterminate-assignment idea is emphasized. The co-operative project level of teaching is approximated. Not less, but far more, subject-matter, facts, and information will be used under the stimulus of a real challenge. Lessons will not be learned to-day for the primary purposes of recitation to-morrow and an examination a month hence. Power to use authority (accredited subject-matter) in working out very definite principles in a functional interpretation of the materials of instruction will be constantly focussed upon in the procedure of directing study.

Production of Changes and the Product.—We, as teachers, are concerned with the production of changes in our pupils. We should be concerned with the problem of developing *thinking* boys and girls. It is relatively easy to determine the accuracy with which pupils are able to reproduce results of training. A vast array of connections can be built up in the assimilation of dabs of information. The measurement of results is

a type of analysis which may contribute little, if anything, to an effective procedure to be employed in the *production* of desirable changes in our pupils. It is one thing to test the ability of the pupil to respond correctly in answering the "question," "What is the Monroe Doctrine?" or "What is the square root of sixteen?"; it is an entirely different task to teach the meaning or significance of the Monroe Doctrine or the concept of square root. The distinction between the product and the process of producing results is sharply drawn in this connection for purposes of emphasis. Our problem is to stimulate and guide mental life in the production of such changes as are deemed most fruitful for the individual and most desirable in our social order.

Persistence of Absolutistic Conceptions.—Even if it were scientifically possible to measure the general intelligence or mentality of boys and girls and to ascribe to each a proper "intelligence quotient" (or some other expression of what tends to become a finality or a fixity), and if it were a demonstrable proposition that by education not "one cubit could be added" to one's intellectual stature (a contention which seems absurd in the light of modern science)—even so, we would still be confronted with the abiding task of fabricating procedures that would enable each individual to attain *his* maximum development. And then, if it should appear that each individual is potentially able to reach his particular level (his "*intelligence quotient*" level of 90, 100, 120, 140, or what not) in any legitimate field of education from the three R's to an appreciation of "Hamlet," we would still be unable to find any way of escaping responsibility for the development of

the most effective procedures possible for every boy and girl. At all events, a deliberate adherence to the method of modern science would serve to develop a new attitude toward the pupil who is having difficulty in any study in the curriculum. The dogmatism of the absolutist in pronouncing hasty judgment upon the capacity and potentiality of pupils is well known. It is quite the fashion to say that this boy is born "short" in capacity to appreciate or to learn Latin, and that this girl is biologically unfit for the study of algebra, and so on. Pedagogical determinism is constantly creeping into the teacher's philosophy.

If one takes the anatomical view of the organization of nerve-cells as the basis of intelligence, and assumes that differences in ability and performance are due to the original structure of the nervous system, there is a temptation to prove an *alibi* by insisting that the student who fails is lacking in quality or number of original nerve-cells. The schoolmaster for ten thousand years has been adept in the invention of formulas by which to explain the delinquencies of his pupils. Evidence may point strongly to the anatomical basis of intelligence, and it is logically possible that differences in capacity are conditioned by the number of neurones. Biologists have much to offer in this analysis. The functioning of special areas of the brain—the speech, visual, auditory, and memory centres, for example—would seem to indicate that the higher functions of the mind are conditioned by the organization of neurones. The unexplored areas of the brain are an inviting field for the scientist. Little is yet actually known about the higher powers of the mind. What is known does not enable the teacher to know *in advance*

of the journey the probable success of a given candidate in the pursuit of the multiplication tables or the laws of falling bodies. The experimental method obviates the necessity of thinking in terms of absolutes; it "tries to break down apparent fixities and to induce changes." If every form of educational determinism is deleted from our philosophy, the challenge of instituting our children and fledgling youth into their rich social and racial heritage, together with building procedures for the release of potentialities, is a superb challenge.

Habits of Study.—If, in our thinking about the development and the progress of the individual, we start with physiological tendencies and work up through habituation, we ought to be impressed with the high potentiality for *uprise* and *downslide* conditioned by circumstance and opportunity. The possibilities for progress can hardly be overestimated when normally constituted children and youth are stimulated and guided in both early home training and schooling along productive lines of habit building. All through our theme behavioristic psychology is emphasized. We speak of habits of all sorts: habits of expression, habits of attention, habits of application, habits of thinking, and so on. The common way of saying, "That person is a creature of habits," expresses the significance we attach to habits. The *urge* to excellence is perhaps mainly an organization of habits in terms of some particular mode of achievement. The formation of habits, the production of good habits, and the prevention of bad habits, both the positive and the negative side of habituation—all these imply a possibility of control and direction. In the attempt to analyze initiative, creativeness, intelligence, we find ourselves

working definitely into explanations and discussions of ways or habits of thinking. The pupil who is given to passivity, never taking responsibility for a forward drive into a new situation unless specifically prodded on, is a pupil with a definite organization of habits—the habits of passivity and docility. On the other hand, the student who is alert to new situations, who drives ahead on his own account, he, too, is exhibiting a system of habits—effective habits of initiative. We may not be able to teach pupils how to study before they are able to study, just as we may not be able to teach a boy to swim prior to his own swimming; but we maintain the proposition that teaching in terms of directing activity does warrant the view that we may bring about improvement in habits of study. To be sure, our adaptive experience is expressed in terms of habit; inventive intelligence makes use of habits under the stimulus of problems to be solved.

Directing study may be partially defined as a technic of building economical and productive habits of thinking. It is maintained that deliberate provision should be constantly made for the development and exercise of the pupils' originality, initiative, responsibility, and creativeness as well as the assimilative and conservative activities. These qualities may escape direct methods of development. The futility of commanding pupils to think is obvious. To be content with external forms of attention or concentration betrays an easy and uncritical acceptance of pedagogical dogma. Unless pupils are gaining in capacity to apply their powers to real tasks the school is not performing its proper function; unless there is a growing sense of responsibility, a developing *must-be* from within, the pupil

may actually be deteriorating while making a superficial progress in the school. An effective direction of habits of work would seem to be an important factor in the development of these high qualities of the mind. It is not enough any longer to point with pride to those who have passed through the schools, attributing their successes indiscriminately to the schools and the subjects pursued. Other factors have their weight. The rather daring programme is being urged that a more deliberate emphasis shall be given to the development of the thinking man than has appeared in the traditional school.

Many other aspects of the problem of directing study are cited in preceding discussions. These few tentative statements are presented for the purpose of re-emphasizing lines of departure in an attempt to work into a new general methodology.

Fixing Responsibility.—After all, the most important thing in education is to have boys and girls *wanting* to learn. *For the ultimate veto lies in the pupil.* If he refuses to respond, the best teaching is of no avail. Any teacher able to devise procedures in which conspicuously large numbers of pupils really *want* to master their studies transcends accredited "methods" and grips essential values in stimulating and guiding mental life. The desire and the ability to lay hold of a difficult task and see it through are invaluable traits. This position is maintained in spite of the controversy on "mental training." It is indeed a "soft pedagogy" that encourages any relinquishment of effort; we need a new emphasis on continued effort in our schools to-day. This concession is frankly made to the schoolmaster who is prone to indulge to the full

his inveterate penchant for formalism. "Accuracy and exactness of thought and mind" may turn out to be a fiction in so far as general powers are concerned. There may be no priceless power gained in conquering difficulties as such. The ability to stare ox-like a tough, disagreeable task out of countenance may smack of a Puritanism long since outgrown. Nevertheless, until the exponents of progressive education find a technic by which direct values are assured, the old shibboleths of the formalist will still be found serviceable and in a sense practical.

The school loafer is a menace to free education. The increasing cost of high-school and higher public education is becoming a serious problem. The principle should be clearly recognized that education is free only in the sense that it is offered to those boys and girls and young men and women who are willing to respond and to take their full share of responsibility in seeing to it that, in so far as they are concerned, their obligation to develop themselves to the full measure of their possibilities is fully met. This does not mean a denial of educational opportunity to any serious-minded individual. It does not mean a predetermined selection of ability under any insidious form of aristocracy. Any student prepared to enter upon any administrative unit of the public system of education should be given an opportunity to try his powers. At the same time, it would seem to be necessary and fitting to remind the student of his obligation. Education should be made free to those who put forth effort commensurate with their developing powers. Public opinion, and particularly school public opinion, should be educated in the appreciation of the cor-

relative nature of rights and duties. Youth of high-school age ought to be able to understand the full significance of this proposition and induced to act accordingly. Doubtless far more than has been accomplished heretofore could be done to help pupils develop a keen sense of personal responsibility for the realization of their own possibilities through education.

This is one side of the shield. The other side is necessarily such revaluation and readjustment of educational practices as will make it clearly possible for each individual to grow into the full measure of his possibility. It ought to be evident that the pupil should not bear the entire responsibility in the disagreement between himself and the school. All systems, theories, principles, "methods" gain a new significance with every application to life; they become fluid in their use. Rigid, arbitrary, and dogmatic fixities can be applied to inanimate bodies or mere automatons. The spirit of the experimental method suggests change and adaptability. Fruitful modifications of method are to be expected in any attempt to adjust education to the needs of pupils.

The science which is applied to inanimate objects is not the kind of science to be applied to the art of teaching. The science which enables one to predict exact outcomes is not the kind of science which can be utilized by the teacher in his essential problem of stimulating and guiding mental life. *Just what to do next in the educative process never falls within cut-and-dried formulas.* Even Spencer's evolutionary laws fail us as a guide if we provide any place in our philosophy for the exercise of creative ability, initiative, inventiveness. Self-conscious beings find little comfort in rid-

ing on the back of some mechanically driven evolutionary Pegasus. The issue of democracy is that man has a share in building his world and that he is not a mere creature of an external law—the same yesterday, to-day, and forever.

It is idle to talk about history repeating itself in a world of changes. The indolent formalist who holds tenaciously to the *status quo* and the *mores* is not assisting the potential citizens of the coming generation to cope with the problems of the new age. It is inconceivable that any one educated to think in terms of the modern-science outlook should any longer maintain the dogmas that "Whatever is, is right"; that "It is; therefore it ought to be"; that "Human nature cannot be changed"; or that "Since we have always had war, we always will." The persistence of such determined ignorance can be explained only by uncritical acceptance of an old philosophy unsuited to the requirements of modern life. The dogma of acceptance, blind reliance upon authority, resignation are terms and attitudes which are incompatible with the theory of development and growth, and a world that must be improved by human effort. When Margaret Fuller announced that "she accepted the Universe," Carlyle answered: "Gad, she'd better." A more modern thinker answered her by saying: "Gad, she'd better *not*." A lip-service to knowledge is a poor and an inadequate preparation to meet the exigencies of modern life. Henry Adams saw the difficulty with the current practice when in one cryptic sentence in his "Education" he remarked, "Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of inert facts."

Direction of Activity as Education.—Turning from the more or less pessimistic observations upon education and teaching, the conception of education as direction of activity becomes wholesome and inspiring. Experience, knowledge, theory, absolutes of every conceivable variety, must be continuously reconstructed at the point of the crisis or difficulty in solving the problems of life. Intelligence lays hold of the past, organizes it, and reconstructs it for the purpose of furnishing the will a point from which to embark in doing the next thing in a changing order. In a sense, the future toward which we, as teachers, are constantly working is a Plutonian wilderness. Intelligence working at the point of difficulty furnishes the only searchlight available for guidance in the solution of a problem. Plan and purpose are not predetermined; they are evolving factors in a changing, growing order—self-originating, self-directing, immanent.

Without a problem there is no creative thinking, expresses the central principle in this new procedure. For the high school it might well become a motto toward which all activities lead and the guiding influence in projecting the curriculum into increasing areas. The teacher who turns from the primacy of subject-matter to the problem of directing mental life at the point of difficulty faces a new and far-reaching task. The thrill of adventure and the stirring of the challenge appeal to constructive minds and give a zest to life. The programme presupposes both a disposition to study pupils at work and also a tremendous responsibility in devising controls that will insure productive effort. We entertain no illusion about understanding boys and girls. Our ignorance of how children are drawn

toward increased social efficiency or any other objective is appalling. One can easily agree with Dr. Thorndike when he says: "The psychology of a ten-year-old boy would probably involve as much subject-matter for investigation as the astronomy of a solar system or the geology of a continent."

Some player of consummate skill may allege that he knows all the possible moves in the game, and that no matter how the novice proceeds he, the perfect player, is doomed to win. All that, however, belongs to a world made perfect, but not to the world as we know it. In a world of change moral hazards must be taken when venturing on the uncharted seas of human conduct. To think of providing the will with a point of departure; to appreciate the significance of systems, formulas, principles, and theories which are ever turning fluid when applied to life situations; to be able to reconstruct experience in meeting ever-new situations in the spirit of the experimental scientist—such a general attitude of mind is essential in working out the thesis of directing study as conceived in this presentation.

SUGGESTIVE HELPS AND PROBLEMS FOR TEACHERS IN USING THIS BOOK

Almost any one problem selected from the list below might prove an adequate basis for a profitable study or essay for any group of teachers. The object in these suggestive helps is to find out not whether the book has been read; to ascertain not whether the reader knows what the book says on page so and so, but rather to stimulate creative thinking and to develop a problem-solving attitude toward teaching. These questions with their settings are challenges. Agreement is not sought. Identity of opinion is ordinarily quite stupid indeed. The true educator suffers the pain of honest doubt; he rarely enjoys poor pedagogical health. The hope is that thought-provoking discussions may be promoted in a co-operative study of these questions among teachers and their professional associates. Parents, social workers, and others vitally interested in schools and public welfare may be invited to join study groups. It is suggested that a study group be formed and that debates and discussions be arranged among teachers and supervisors, using any part of the material suggested below that appears to be inviting and potent. Perhaps a chapter or a question in this list would furnish a basis for such a study group for a month or a

year. One of the most profitable procedures would be to conduct an experiment along the lines suggested in Chapters I and III and make the experiment the basis of discussion in the study group.

PREFACE

1. Out of the statement of aims formulate in your own way a constructive analysis of educational practice as you know it and suggest modifications for improvement. Take a school you are familiar with; describe what goes on in the classroom, evaluate what you see, and present a real system of vital education as you conceive it ought to be.

2. The index, intelligence quotient, I. Q., is the ratio between mental age and chronological age. If the child is 8 years old and tests the same age mentally, the I. Q. is 100. If the mental age is 10 and the chronological age is 8 (2 is ¼ of 8), add 25, and the I. Q. is 125. If mental age is 6 and chronological age is 8 (2 is ¼ of 8), subtract 25, and the I. Q. is 75. These ratios are worked out in terms of retardation and acceleration. Do you think a child's I. Q. (this index) is likely to remain permanent from 5 to 14 years of age? Are differences in the intelligence quotients due to differences in native mentality or circumstances, such as health, nutrition, vitality, temperament, education? Is there such a thing as arrested development or a waking up to the fine points of the game?

3. Study the purpose of education. What kind of minds are being made in the schools you know? Is it true that acceptance of beliefs or conclusions has characterized education? Give examples. Try the experiment of asking your neighbor why he is a Methodist or Seventh Day Adventist, a republican or democrat in party politics, and then challenge the reasons given. Does he fly *passionately* to a defense of his belief, or does he calmly examine the question in the light of the facts?

4. What is the effect of having students learn lessons as they do ordinarily, and of hearing them *said* in the traditional way? Is the practice a vital improvement on rote learning? Does the acceptance of ready-made conclusions promote creative think-

ing or develop minds expectant of change? Indicate a procedure in which a problem may be analyzed in the light of facts.

5. Do you hold that facts (accredited knowledge) must be had before thinking can be carried on? How do you account for the questions of the little child before entering school? Do we first gather facts and *then* do some thinking? How do we think? Did you ever watch a beetle with his load trying to surmount an obstacle in its path? Study some such situation and note the "trial and error" method, and relate it to the method of "fumbling and success" illustrated in the laboratory by the inventor or scientist. Do you recall the way your mind worked as you solved a difficult exercise in geometry or grammar? Did the beetle think? Did you think in that difficult problem?

6. Keep the new aim of education in mind in attacking these exercises. Describe the educated man. What are his characteristics and what is the task of education in *making* the individual?

CHAPTER I

1. What is the function of the teacher in this threefold relationship: *pupil, subject, teacher?* Can a person impart information? A piece of pie can be passed over; a brick can be hurled at a person. Is the pupil "a hedge to be trimmed, or a torrent to be confined"? Do "we" mould the child in school or does man create himself by his own activity?

2. "Only when an effect which you wish to produce depends upon a fraction or preposition are such things humanly worth knowing." Is this a sound, valid, and valuable guide in dealing with the materials of instruction? We used to teach the alphabet, learned a mass of combinations, as *ab, og, im,* and *then* advanced to simple words as *cat, at, am, dog.* Big words were taboo. The little minds had to march along in a lock-step, regimental uniformity from the "simple to the complex." Did they learn to read? Yes, in spite of the system! Should we teach the multiplication tables as such, or conjugations of verbs as such? Justify some conventional practice in the light of these facts on the use of data, and the way reading is taught today.

3. "Give the child something to do which he cannot do

without finding out what *you* would like to have him know." Study the suggestive exercises in Chapter I and work out a projected challenge in some original way, selecting any subject or topic with which you are fairly familiar. Try a word list, working it up co-operatively for a spelling contest. What would you do with the prescribed course of study which sets a minimum word list for each grade? Would you follow it literally, or include that minimum with your free list? Try a nature-study problem or a general-science problem. Rainfall maps and forestry maps might be used. Are you sure pupils in the upper grades could come to any independent judgments in the use of such materials? High school teachers could set up problems in their special fields. Distinguish between capacity to assimilate the printed page in a regurgitation of lessons and a productive, creative use of materials in the pursuit of a problem.

4. Work out a statement of what our civilization would be if the alphabet and printing were suddenly obliterated. What kind of world would we have? Try to divide 3245.65 by 248.5, using the Roman notation. A Greek mathematician stepping into our modern world would be amazed to find everybody doing long division. Indicate the extent to which human powers of abstraction (thinking) have been liberated by the introduction of the arabic notation. Did it ever occur to you that our arithmetic, as well as our modern science, came from the Saracenic world, but was delayed some four or five centuries because of bigotry and prejudice? The "heathen dogs" could not give the Christian world anything! We still think of the "Renaissance" as the revival of learning; perhaps it was the revival of the "palsy of a doting age". Take the 26 letters of the alphabet and multiply 1 by 2, that product by 3, and the new product by 4, and so on until you have multiplied by every number up to 26. The final product will give you a startling conception of the possibilities of forming new combinations out of simple elements. The final product indicates the number of permutations these 26 elements can be fashioned into. The printer throws down the type and creates a new page by recombining these simple elements. The copy mind tries to collect a glorified bag of tricks to live on; the alphabetical mind throws down the type and creates a new movie film to meet the new situation. "Fire, cattle-herding, weaving, pottery, tillage, horse-taming, the go-

ing down to sea in ships of men with hearts of treble brass," the alphabet, the arabic notation, electromagnetism (radio) are all world-shaking events and discoveries which have "commoved a bewildered humanity which found itself (with each discovery) raised one giddy step above the brute." The modern machine (printing-press, automobile, locomotive, dynamo) has been made possible by arithmetic, the quadratic equation, etc. The difference between a howling savage back among the cavemen and a twentieth-century man in civilized America is not so much a difference in physiological structure as a difference in the humanity (social organization) into which each is born. Take the alphabet or the arabic notation and work out a statement showing how man's powers have been liberated by these epoch-making discoveries. What do you think of any child's potentiality for further development after capacity to deal with words in new combinations and capacity to carry on computation processes in the fundamental operations have been acquired?

5. Have you ever had the thrill of being a victim of such judges of manual righteousness as the square, the level, and the plumb-bob? Try to use your opinions, your powers of persuasion, your theories on a machine that refuses to go. The machine is an "irreclaimable rationalist." Working in cement suggests a certain sanity in fashioning materials; the "Village Blacksmith" yields a solidity of character. The Greeks dealt with *ideas;* the Saracenic world (9th to 12th centuries) dealt with *facts;* the "Renaissance" was engaged with *words*, often with empty verbalisms and hollow presentment of ideas. Out of the last of these three stages we have had "imitation, more imitation, and more strict imitation." What has been the effect upon education of this long period of excessive imitation of the past? What has happened in the material world during the past 300 years and notably in the past 50 years, by working with facts and ideas, by analyzing problems in the light of facts? What in your judgment is the value to a teacher of working out some tangible, objective (concrete) project—a bit of constructive art work—such as the making of a real design to work by or the building of a real hat, dress, table, or wheel in a machine?

6. What do you say when the boy fails? Do you say he can't learn it, or that he has not learned it yet? What is the effect of telling a boy he is "no good"? Do you think a boy

labelled incompetent is likely to prove that he is "no good"? Are we prone to measure (judge) others in terms of our particular modes of excellence (erudition perhaps) and fail to appraise special merit in other lines? Illustrate. Do teachers and educators *mother* the curriculum? Are special ways of educational salvation charted and jealously guarded? The high churchman of England, on being interrogated as to whether one might be saved by any other route, replied after a bit of agonizing: "Well, I would not like to say there is no other way, but [after a lucid interval] no gentleman would seek any other way, don't you know?" Suggest a definite classroom procedure in which you can give scope to individuality. Remember the American is not a lock-step man in the making; he asks to set energies free in order to release values; he suffers himself to be convinced, not to be commanded; he demands a regulated freedom, *liberty* armed with the law. The American movement does not follow a road already made; the road is traced as the movement goes on. Indicate some ways of squaring procedure to these American demands. Is the child ever too young to begin development along these lines?

7. Try the experiment of directing action in some subject as described on pages 15–25. Write a diary of your experiences in your experiment.

8. Set up a definite experiment designed to arouse curiosity. Take any problem you will. Try to think of the environment and the control of circumstances in which the pupil is stimulated to becoming a reacting agent.

CHAPTER II

1. What is the business of the teacher in the lesson-hearing school? Is order (obedience) or work heaven's first law? The little fellow, on being asked what he was doing in school, replied, that he was just waiting for the rest of them to catch up. Suggest ways of meeting this child's dilemma. Is it essential that a whole class should work in uniformity—all moving along by the clock? If so, why? If not, what then?

2. How long should the class period be in the Junior High School? in the Senior High School? What would you suggest as the most productive use to be made of a class period of 40

minutes? of 70 minutes? What are pupils doing when the teacher and a single pupil are engaged in a recitation dialogue?

3. What is the value of the recitation, the reiteration of lessons? Is there waste in the system? Can it be avoided? Is there any value in having a pupil recite a thing he knows perfectly well? What *is* the value in it? Is there any value in siphoning vacuums in class, compelling all to pay attention to the process? If so, what? Do teachers ask pupils questions which they know they cannot answer before they ask them? Indicate all the ways of wasting time and energy in some class you have examined.

4. How would you direct classroom procedure to more productive outcomes than are usually secured in the conventional school? Would it be profitable to have every pupil working forward at his own best rate in a real challenge? What would be the function of the teacher in such procedure?

5. What are the disadvantages in making the class the unit of instruction? Can you make the pupil the educative unit? If so, how would you secure unity? Study a given class group as follows: assign a definite set task of 10 exercises or 5 pages. Try to find out what each pupil accomplishes (as well as what his father and mother accomplish in assisting in the preparation of lessons). Place the pupils in some scale according to your own devising. Then try another plan: have the same pupils start, all on their marks, and work forward in similar material for a whole class period (one or more) and compare results in the two situations. Now work out ten significant questions to put up to teachers in the lesson-hearing school. What is to be done with the boy who solves 50 exercises in a single class period under the stimulus of directed guidance? Also what is to be done with a classmate who gets only 3 exercises in the same time? Is the school a practising ground for morality for either when 10 exercises are assigned for the next lesson, with a swift command, *Class excused?*

6. What opportunity has the teacher to examine the habits of work of pupils in the recitation and lecture systems? Devise some procedure in which habits of work may be studied. Connect procedures with educational guidance.

CHAPTER III

Suggestion: The basis for appreciation of the learning process is to be found in a controlled experiment in actual learning. Teachers are urged to work out for themselves a heroic experiment in mastering some problem of learning, keeping an accurate check on the progress made and a diary of their experiences from day to day. Chapter III is an attempt to create interest in *teacher study*. Teachers need it in their efforts to gain adequate notions about pupils at work; it is also a vital way of improving teachers in service. Supervisors and all other pedagogical commandants who go about advising teachers *how to do it* need to study their own mental processes in a vital learning problem of their own, in order that they may be everlastingly mindful of backgrounds and difficulties in learning.

1. Work out a controlled experiment such as is suggested, p. 96 ff.

2. Is capacity to recognize a simple element in a relatively simple situation a guaranty of capacity to recognize that simple element in a relatively more complex situation (in a moving, learning synthesis)? Is there any experimental evidence to support either an affirmative or a negative answer to this proposition?

3. Is inability to recognize (know) a simple element in a simple situation (out of context) a criterion of inability to recognize or use that simple element in a moving, learning situation? Support the answer with any data possible.

4. In a learning process (not in a social-practical world) when is a response (answer) right or correct and when is it wrong or incorrect, and how much or to what extent may it be either? Illustrate. When handwriting is appraised does just ability "to take pen in hand" and make a blot on paper have any significance? Where is *just no ability* in handwriting to be located in a scale of differences representing results in handwriting?

5. When one tries in vain to recall a familiar name and subsequently in walking along indifferently engaging in revery, it comes "to mind," what is the explanation? Was the name forgotten? Study the problem in terms of the things that lie in the focus of attention now and then out in the marginal areas—the things that are explicit at one time and implicit at another.

Do these wily facts we deal with in teaching play hide and seek with each other in the mass meeting of the mind? When are mistakes evidences of progress?

6. When pupils say, "I can't get the problem," "I don't understand it," what is the real difficulty?

7. Set up some such controlled procedure as is indicated on pp. 120–125, keep a record of progress noting experiences in directing the work in hand, and present a brief summary of conclusions and values derived from it. Do difficulties come to a group of working students by the clock? Justify the formal methods of having thirty pupils in any class attack the same thing, at the same time, in the same way. When all are working forward within a challenge indicate the results. Are they uniform? What is the justification of having the whole class pay attention to an explanation, or to a review? What does it mean to direct the pupil's activity at the point of difficulty? Do teachers talk too much?

8. Does each individual develop his own habits of work, his own intellectual method? Is there some general "frame of reference" within which each individual may develop his own unique patterns of work and thinking? What is difficult for one pupil may be perfectly easy for another. Illustrate, if possible. Is it a waste of time and energy to hold all members of the class to a regimental uniformity? What are some ways of making provision for individuality in a given class group?

CHAPTER IV

1. What specific aims have been sought in the topic method? Is there any way to organize the topic procedure so that every contribution and discussion would be an illumination of a common integrating idea or principle? Illustrate.

2. Select any course of instruction—English, grammar, American history, geometry, chemistry, drawing—(or any other) and work out a statement of organizing ideas and submit a few sets of illustrative exercises in varying amounts to make clear the practical significance of differentials.

3. Explain and illustrate the *indeterminate* assignment idea. Use any material in which there is a fair degree of familiarity.

4. Present a statement of a specific preparation of the new teacher in a directing-study procedure.

5. Is it possible to develop in students *at work* the habit of working mainly for the "wages of going on"? Does a minimum essential (a set lesson) become the maximum necessity? What is the effect upon both the teacher and the pupil in prescribing daily set lessons under methods of uniformity?

6. Who in the game of contest feels the sting of defeat? Is there not a vast amount of soft pedagogy in sentimental talk about the boy, 5th or 25th, in the race? Note the fact that all pupils, those having the lowest score, were energizing far above any minimum that would have been set. (Pp. 168–172.)

CHAPTER V

1. Collect information in a specific recitation from the pupils on what each one is doing during the recitation. Try to find a typical traditional recitation. It would be illuminating to find out just what each individual is thinking about in a college class under the lecture system.

2. Does the recitation system, or lecture system, promote passivity, acceptance of belief, unchallenged opinion? How can the spectator (in class, before the film, in front of the book, facing the lecturer) be converted into a participant? Devise some procedure calculated to produce *reacting agents* out of our passive students.

3. In what sense is a teacher's primary business that of fashioning (shaping or building) an environment in which creative thinking may be promoted?

4. Indicate the teacher's task in directing activity in a definite example. Amplify, *What am I to do next in this situation?* Locate responsibility of teacher and pupil in a procedure in which the interaction of teaching and learning prevails.

5. When does a question come in front of the answer? Do students who give correct answers necessarily *know* the correct answers?

CHAPTER VI

1. Work out a distinction between a mechanical theory of society (or education) and the social theory of society (or education).

2. Explain the social principle in relation to a shared life.

3. Is it possible to lay down definite laws or rules to be followed in developing or teaching all subjects? Is it probable that any such laws are applicable to the mind's way of operating before a challenge or problem? When the emphasis is shifted from the primacy of subject-matter and mechanical methods to the primacy of boys and girls working forward in a challenge, what becomes of such devices as the five formal steps?

4. Envisage an ideal school; describe the teacher in it; paint a vivid word picture of the pupil with inhibitions removed and *at work* under a responsible freedom.

5. Distinguish between art and science. Is prediction possible or essential in a human situation? Can we know what to do next in dealing with human behavior? What does it mean to take the moral hazard? A rule is laid down in September to the effect that if a boy plays truant in March he will be required to stay after school five consecutive days and to walk 217 parasangs round and round the building each day. What's wrong with such rules? A boy misses his school seven times in a hundred and repeats this practice often enough to warrant stating it as a law. Then the delinquent boy is apprised of the regularity of his absences. He proceeds at once to correct the matter. In the next hundred days there are no absences. What becomes of the law? A rule is made that teachers shall not use tobacco. (Not that they should be encouraged to do so.) Anybody, however incompetent, could live up to such rules.

6. Does the scientific method, or rather the method of the experimental scientist, apply in the moral realm and in the art of teaching? (See definition of scientific method, p. 372.)

CHAPTER VII

1. Define *freedom* as *capacity* and relate it to self-discipline with a working distinction between a real freedom and a mass of loose ideas—such as general indulgence, "personal liberty," rights, license, anarchy of tolerance, spurious relinquishments of idleness and asceticism, honest opinions, and neurotic cravings to paddle one's own canoe irrespective of social restraints.

2. Study a half-dozen successful persons whom you know, and try to account for their development. Is genius or talent

or power self-created out of opportunity to grow in the direction of successful experimentation? What is the effect of encouragers in the first expressions of the child in language, music, art, use of tools, etc.? Are there dispositions or impulses to grow and habits of life common to all normally constituted human beings out of which potential powers may be realized?

3. Set up a problem in which initiative may be developed. (See chapter I and pp. 125–126.) Cite a clear-cut example of the exercise of initiative either in or out of school.

4. Establish the relation between mechanical, formal, superimposed methods and the growth of initiative.

CHAPTER VIII

1. Indicate the task of education in terms of the transmission of our social heredity. Make a clear distinction between physiological heredity and social heredity.

2. In considering diversification of capacities and powers as a dominant characteristic of American life is it essential to try to establish upper limits for any individual? Instead of thinking of the equality of persons or of differences in original nature, would it not be a wholesome philosophy to start with each individual as a developing personality with measureless capacity for growth and self-realization? Is it true that teaching is concerned with the thesis that *success is a function of effort and opportunity?*

3. About 150 years ago it was quite generally held that it would be fatal to teach all children to read. "Who will do the unpleasant types of work if everybody is taught to read?" said the called and chosen. "Besides," they said, "there are large numbers born short, who have not sufficient mentality to learn to read and compute." Is long division the most difficult stage, relatively speaking, in mathematics from mere counting to calculus? Nobody any longer seriously questions the ability of children to master long division. Teachers face the task with determination and confidence that it shall be done. Public opinion supports the general proposition of the educability of all children up through the four fundamental social arts—the 3 R's and drawing in our elementary schools. Is a girl in the high school biologically unfit for the study and mastery of algebra?

Is any boy in the high school by nature incapacitated for the mastery of grammar? May not high school education *now* in the 20th century be regarded as the essential basis for a broadcasted intelligence—a common background upon which to focus every person's life? All boys and girls in the high school can, if they will, succeed in any study in the curriculum. What is your reaction? The boy is tagged as failing in Latin early in the year. The teacher says he can't learn it and asks to have him transferred to some other course. The boy goes into stenography and masters it. May not stenography be as difficult as Latin? Account for failure in one and success in the other.

CHAPTER IX

1. Is a philosophy of teaching essential? Is there a danger in pretending not to have a philosophy about human nature and at the same time being a victim of a most pernicious variety of thinking and practice in dealing with a human situation?

2. Explain the purpose of a scientific principle or a formula in working in the field of human behavior. Is the practice of medicine made simpler and easier by the introduction of our modern scientific technic? Was it not much easier in the days of magic, pills, and nostrums? A proper use of the surgeon's instruments requires years of training, high skill, and technical ability. Can anybody teach? Teachers are now required to analyze, diagnose, study the "patients" or "cases," prescribe treatment, and if the "cases" do not respond further diagnosis, analysis, and study must follow and a change in treatment be provided. Has this suggestion any bearing on directing study?

3. Is the dominant purpose of the high school the training of leaders? Are leaders born, *i. e.*, do their powers depend upon native gifts or are they made in the stream of life? The question of the "fitness" of children used to be raised in connection with elementary education. That is ancient history now. It is contended that only 25 per cent to 30 per cent of the adolescent population of the United States have sufficient mentality to profit by a high-school education. What is your reaction to this assumption? Public elementary and secondary education is concerned mainly with the task of making the "common man" an efficient participant in the social, moral, intellectual, material,

and civic life of the community and the nation and also to teach people how to live together in a democracy. Is leadership an emerging quality out of the try-out of all in a system of education in which resources are tapped from every level of society? Is not the responsibility of the school very definitely centred in the proposition that the fullest development of every individual is imperative? In what procedure will it be possible for each individual to go forward at his own best rate? Keep in mind the call for individualism and the need of developing the genius for co-operation. It is being seriously proposed that, beginning as early as the junior high school, the probable "fitness" of little boys and girls shall be ascertained (five levels of intelligence have been suggested), and that, since there are five levels of occupations requiring corresponding levels of intelligence, the pupils shall be classified so as to match levels of intelligence with levels of occupations. The pupils of highest intelligence should be channelled into a curriculum (and classification) that would fit them for the "work of life" requiring the highest intelligence, etc. What do you think about it?

4. Thinking is a function of habit. Explain this proposition.

5. Without a problem there is no (creative) thinking. To what extent is it possible to develop classroom procedures in the direction of this statement? A study of definitions, appended, may prove suggestive in attacking the problem.

DEFINITION AND USE OF TERMS

Alternate leaderships—a recognition of technical and trained ability in a theory of society based upon *diversification* of merits; a new basis of intelligent co-operation in which every individual counts; each individual retains self-respect by his unique contribution in a *shared life;* the teacher is appreciated, not for erudition, but for expert capacity in directing activity, in becoming a consulting expert, in stimulating curiosity, in arousing enthusiasm.

Americanism—a social theory of life in which persons are priceless, measureless in capacity, and free—never regarded as things, tools, or servants to be fashioned to mechanical ends; each person finds (realizes) the purpose of his life by living it; authentic Americanism is a developing synthesis made by withdrawing from each element (race or individual) the best qualities and recomposing them in a symphony of ideals and practices; the spirit of *give-and-take* and the policy of *live-and-let-live* characterize a true democratic society; in it all are true sportsmen and equal in that sense; no two persons are ever equal in attainment; uniformity is not the essence of Americanism; *e pluribus unum* (one from many) and the converse, *many from one* (ideal),* will help teachers to see education in a truer light.

Challenge—any body of materials or principles presented as a basis of study for a class group; substituted for lesson, project, problem, topic methods; time, indeterminate (*i. e.*, it may be a day's work, two or three days' work, a week or six weeks or even longer); in it no upper limit is set for any pupil at any time; the circle is described big enough to give profitable work for every one; principles (organizing ideas) are common elements of unity—exercises (indeterminate but definite) furnish a basis for recognizing individual differences. See Chap. I.

Co-operative learning—any form of self-teaching or partnership and group activities developed by the teacher in guiding

* *Plures ex uno.*

pupils in their work; an application of the social principle in classroom procedure; a whole class may work in partnerships (two in each) or in groups with a leader, one pupil hearing another recite, or one acting as chairman in a group, or two or more working forward under productive conversational practices; a means of curing some pupils of work-shyness produced by a lesion of social sense; in such procedures teachers become directors of action, consulting experts, and general managers.

Corporate spirit—opposed to group mediocrity and uniformity and regimentation of all kinds; some highest common multiple is sought in which to express a community of interests; up out of individual activity (each on his mark) toward consensus and unity is the direction of a responsible freedom; under the *challenge* each strives for self-mastery in his own best way—the movement is toward co-operations out of directed self-activity; the pupil, not the class, is the *educative unit;* the ideal of organization (the majesty of plan and precision) is regarded, not as an end, but a means in the development of a self-active, responsible person.

Creativeness—a purposeful activity in which raw materials from brute facts to pigments, from passions to ideals are being fashioned toward some goal—not for the "sake of the loaves and fishes"; building a tangible project—cabinet, cake, picture, blue print—fabricating a story, constructing a chapter, working out a problem in history or what not—in short, using materials of any sort in the realization of some worthy purpose or ideal suggests creativeness; teachers cannot rely on old movie films stored up in the rag-bag of memory—a new movie film must be created in a *free reconstruction* of the past at the fork of the road.

Determinism—any philosophy or practice that hinders a free and continuous *revaluation* of persons; a belief that man by original nature is doomed. The branding of children as incompetent, "no good," tends to cut the nerve of effort-making capacity; initiative drops out of sight.

Education—interpreted as a process of *creativeness* in which we make the individual, in which we seek to build a mind tolerant, fearlessly honest, expectant of change, inventive, alert, and resourceful.

Educative unit—instead of the class, the pupil in any group is the educative unit; individual achievement is focal; materials of

instruction are to be gripped in *challenges* in which there is provision for both free individual energizing and co-operations.

Fork-of-the-road education—vital education (not training) begins at the point of crisis; new situations call for creative thinking; exact copies are not used at the point of difficulty; playing the game (chess or football) illustrates action at the fork of the road: the new set of circumstances and combinations must be met by creating a new movie film at the point of deciding what to do next in *this* situation—a situation which never occurred on land or sea. The past (experience, history, knowledge, facts) as well as temperament, sentiments, passions, beliefs, ideas—all experience up to *this* crisis (new situation) is the raw material upon which intelligence works to furnish the will a point of departure from which to embark.

Heredity—a distinction between physiological heredity and social heredity; arguments in the former may not apply in latter; educative process is concerned essentially with transmission of evolutionary products; man's powers are born out of the loins of humanity; humanity is an organism including language customs, beliefs, technics, institutions, every aspect of the social organization—civilization in brief; for the teacher every man is born wholly uncivilized, susceptible of becoming a savage, a fifth-century mind, or a twentieth-century mind; endless variation ought to be expected; it is not the task of education to produce uniformity.

Heredity and classification—two theories: (1) disclose levels of native mentality (educability or basic intelligence), find out what the individual is good for, educate him accordingly, work out groupings for homogeneous ability; (2) dwell on social heredity and keep opportunity open and free and refuse to seek uniformity or mediocrity on any level. An analogy: *automobility*—Fords to Packards all use the common highway; separate roads are not constructed for different makes of cars; the Ford runs under its own power and may pull the Packard out of the ditch or arrive ahead; futile to say one is more useful than the other—neither is endowed with a heaven-born function. Again, the outer wheels are accelerated in turning the corners; they are not removed and given a separate classification. The differential takes care of different speeds.

Our leaders are made in the stream of life. Our leadership is

an emerging quality. Another figure may serve to illuminate the educative process. A complete circle can be produced by a radius of any length by finding a centre of constancy for one end of it and *freedom in work* for the other. The radius of any individual is not heaven-born; it is never a constant. What we need to do is to have complete circles whether the radius be long or short, and to refuse to accept any fatalistic postulates about its potential length in any individual *in the making*. The big circle need not be scandalized by the presence of the smaller circle meshing into it; the smaller circle need not be humiliated by engagement with the larger. A small boy rose to it as if to the manner born by saying that the small wheel is often the most important part of the machine. So much by way of suggestion in the emphasis laid on social heredity in our educational task.

The practical suggestion to teachers is to expect variation in capacity and achievement in every class and provide for differentials within the common challenge.

Indeterminate assignment—a working idea or principle (designated *challenge*) is set forth as a centre of action; within the circle described there is room for an infinite variety of patterns; the pupil, working forward in the challenge, under his own power, does not finish any challenge; no upper limit in materials is set; in fact, the principle is also indeterminate; it is a way of thinking; the facts, the exercises, problems, etc., within a challenge are never fully exhausted; room is provided for superior profitable production beyond mastery. It is not known just how many sentences one needs to work out on the relative pronoun to overtake the *relative-pronoun idea;* the pupil of high power goes on and on in the materials (exercises from many books and sources) up into exceedingly difficult relative-pronoun sentences. To the teacher: grip the relative-pronoun idea as a working principle and then provide abundant raw material to work on—enough to give the most capable pupil all he can do in a real challenge.

Inhibitions—or defense reactions—any self-created or superimposed obstacles hindering free self-expression; fear, repressive measures, lack of understanding of studies, lock-step methods tend to build up inhibitions; working for mastery and creative thinking in a directed-study procedure releases energy.

Mastery—cure for half-learning and a corrective in giving marks indicating incapacity; a relative mastery in the last analy-

sis. After working into a challenge, extending some five or six weeks, set out blocks of material, as many as there are pass marks, and require a mark of excellent in each block in testing for mastery; *e. g.*, block one, containing the essential principles in the challenge and enough exercises (material) for mastery and appreciation of the principles constitutes basis for lowest (of three, say) pass marks, and the student must make excellent in this material to earn lowest pass mark; block two contains all of one and additional exercises or work; to make the next higher mark the student must make excellent in block two, etc. Until this is done a mark of N. M. (No mastery) is used to designate the status of pupil in particular challenges. Mastery is not absolute; there is a progressive mastery as higher stages in the subject are reached. A principle may not be *comprehended* until seen in subsequent relations or in a difficult exercise used to clarify one's intellectual method.

Minimum essentials—the emphasis is shifted from *content* (*i. e.*, pages and quantity of subject-matter) to principles—organizing ideas.

Organizing principles—core ideas, hypotheses, ways of thinking; *the discipline of principles is substituted for the discipline of facts;* a way of thinking is conceived, and data, facts, information are used in thinking the principle; *e. g.*, factoring in mathematics is a way of thinking—it is the *factoring idea* that must be gripped; exercises are the raw materials used in building up the idea; or case in grammar is an organizing principle—it is the *case idea* or *case consciousness;* exercises are so much raw material to be used in building the concept of case; the building materials should be indeterminate in amount so that no upper limit is reached by any member of the class.

Problem—see challenge; the challenge is the more inclusive term; a body of material such as words for spelling in a competitive performance may be a real challenge in which the game furnishes the motive; the problem is a higher type of motivation; in it there is purposeful pursuit in the attainment of objectives embodying creative thinking; what is done at any stage in a real problem procedure is checked up against some hypothesis in the light of facts used in the realization of the goal set up as an end. Without a problem there is no (creative) thinking means that when smooth running action is checked a choice must be made in terms of new factors. The building of minds capable of

analyzing problems in the light of facts is the high aim of education.

Reconstruction of experience—in a world of changes the next step is always at the fork of the road; the next step is never a copy of a preceding step; past experience (history, knowledge, facts, beliefs, sentiments) is the raw material which intelligence works on to furnish the will a way of acting in the next move ahead; this next step is a creative synthesis; it requires the moral hazard; it is the basis of artistic effort; the next move in a human situation calls for a free reconstruction of experience (information, scholarship, methods—all of one's past).

Scientific humanism—a recognition that fixed laws are applicable to inanimate forces in the popular quantitative sense; a formula or scientific principle in a human situation opens the way to a consideration of new phases of life; a human being is of too multiple warp and woof to be comprehended within definitions and formulas. The physician analyzes, diagnoses, studies the patient and prescribes treatment; if the patient does not respond, he carries analysis and diagnosis further and changes the treatment. The scientific principle calls for a high order of skill and creative thinking; it does not simplify the human situation to introduce science in this sense.

Scientific method—the experimental scientist is concerned with setting the thing in *this* and *that* control or set of circumstances to see what happens; he is concerned with change, not with what is originally given; he studies processes in terms of what happens when the thing is placed under new conditions. The method includes a way of thinking, an hypothesis (often arising in challenging an established law or custom), an examination of the facts, an experimental control of the thing in hand, a study of the thing under *this* and *that* control, a redefining of hypotheses in the light of the facts, and a tentative conclusion based upon the experiment. Where there is opportunity to experiment there is hope to improve. The experimental scientist is not seeking a "resting place," a finality; his is a world of changes—never a world of absolutes; he is not looking for copies to be reproduced; his work is a creative synthesis at every turn in the road. The artist and the sculptor, as well as the physicist and the chemist, employ the scientific method.

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